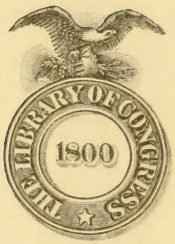
THE MODERN GUIDE FOR FRUIT & TRUCK SHIPPERS AND POULTRY RAISERS IN THE SOUTHERN STATES.



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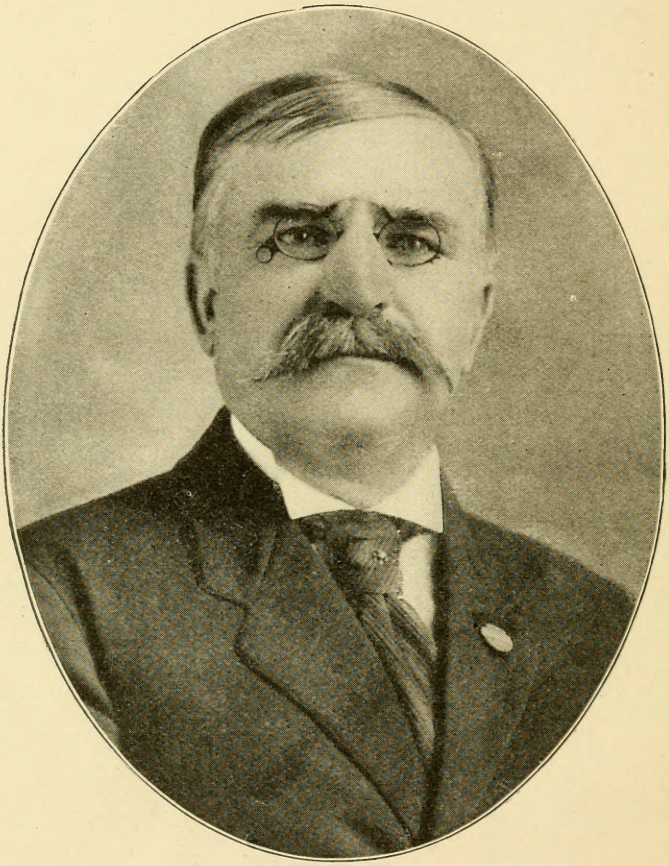

Yours truly
Theodore G. Thomas.

THE MODERN GUIDE

FOR

FRUIT AND TRUCK SHIPPERS

AND

POULTRY RAISERS

IN THE

SOUTHERN STATES

A FULL AND COMPLETE TREATISE ON
DIVERSIFIED FARMING, FRUIT, TRUCK GROWING, POULTRY RAISING AND EGG PRODUCTION FOR MARKET AND PROFIT

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INTRODUCTORY.

PART I.

FRUIT AND TRUCK GARDENS IN THE SOUTH.

The wonderful increase in the past decade of fruit, truck and poultry shipments from the South to the Northern, Eastern and Western markets is due to several causes: The splendid climate and soil of the Southern States, adapted to fruit and truck culture, the earliness of the Southern products, the magnificent railway systems to these markets, the eager demand by the Northern consumers—all contribute to the impetus of the industry. Formerly the Northern citizen, during the period when his fields and gardens were snow-covered and ice-bound, contented himself with preserved fruits, vegetables, stored in cellars, and canned goods. He erected greenhouses, where with artificial heat he could produce such delicacies in the fruit and vegetable line denied to him by his frigid temperature. But artificial heat, with a constantly increasing price of coal and other fuels, is expensive; the product of the greenhouses must be sold at high prices or else grown at a loss, therefore only the wealthy class can enjoy what is out of reach to the middle and poorer classes and here is the South's opportunity. With the congenial, warm climate, bright sunshine, protection by timber from the cold North winds, fanned by the warm breezes from the Gulf stream, the Southern grower is enabled to produce both fruits and vegetables in midwinter as cheaply as further north in the summer time. In our travels through the entire North this last winter, there was not a single day that we did not observe in the large city markets, tomatoes, egg plant, beans, cucumbers, squash, celery, okra, parsley, peas, potatoes, spinach, beets, cauliflower, lettuce, onions, peppers, radishes, strawberries, oranges, grape fruit, all from some point in the Southern States, all in eager demand and selling at satisfactory prices. While the growing of fruits and truck in the South is a pleasant, remunerative employment, ofttimes resulting in almost fabulous profits, to succeed, the business, like any other, must be thoroughly understood in all its details. A fruit or truck grower must be either a fairly educated man or seek and absorb such knowledge held out to him by books and agricultural works published on the subject. Ignorance is an impediment from the seed to market. Mistakes are easily made and experience ofttimes a costly harvest.

There are many features connected with the successful growing and shipping of all fruits and truck, and to eliminate any of these means loss and disappointment.

Selection of proper localities for fruit or vegetable farms, soils, fertilizers; how plants grow; seeds, what varieties succeed best; sowing, planting, cultivation; how to combat and destroy insects; to prevent or cure rust or blight; irrigation and drainage; rotation of crops for better results; forcing plants in the greenhouse or hotbed; how to harvest, pick, select, pack and ship; transportation facilities; favorable markets—all are items which must be studied closely to insure success, and it is for this purpose and enlightenment this work is being published, as all questions will be answered and every contingency provided for in the minutest details.

SELECTION OF LOCALITY FOR A FRUIT AND VEGETABLE GARDEN.

A fruit or truck farm should never be far from the loading station or the railroads; in no case over three miles. Long hauls on rough and bad roads are not conducive to profits and decidedly injurious to the keeping qualities of the products. Spring wagons should invariably be used to haul highly perishable goods to depots. It is also a decided advantage to locate near where there are several railroads and express offices; besides the competition, it provides more daily trains to ship on and offers more direct markets to ship to.

Many of the large commercial orchards, melon and potato fields have special private spurs where cars are set for loading. This, of course, is a self-evident advantage. The land for fruit and truck gardens should be subject to thorough drainage, neither too rolling nor level. Land subject to washing by heavy rains should be avoided, as it causes loss of crops and fertilizers. Location of land protected from the north and west winds by timber or other obstruction is preferable, as the soil warms quicker in the spring and insures an earlier crop. For the same reason a crop planted on the south side of a lake, bay or large stream will be earlier and often escape injuries from late or early frosts, when crops on the north side will be killed. This is explained by the fact that the cold north winds passing over the warm water the lower strata will convey the warmth and moisture to the crop and protect it rather than destroy it. Low ground is more subject to frosts than high ground.

SELECTION OF SOILS.

While fruit trees, nut bearing trees, berries and grapes readily thrive in the hilly, rocky, gravely, heavy, stiff clay soil, all garden truck without any exception, thrives best in a loose, mellow, sandy loam, brought to a high state of cultivation by frequent plowing, and even subsoiling the land is of unquestionably great benefit.

The difference in soils is marked to such a degree that often complete failures are made from want of knowledge of what soil may produce either fruits or vegetables in their perfection. As an example, many root crops, such as potatoes, radishes, beets and others, are deformed, tasteless and unmarketable because they were grown in the wrong soil indigenous to their nature, when top crops, like beans, peas, tomatoes and lettuce, might have made heavy and excellent crops on the very same land.

To a certain kind of soil and climate every kind of agricultural and horticultural product is especially adapted; and each of such products is to certain other kinds of soil and climate to a similar extent unadapted, such fitness increasing or decreasing in many cases through numerous varieties of soils and climes from the latter to the former. In consequence of lack of knowledge with reference to the suitability or nonsuitable of certain plants for certain soils, thousands of dollars are annually lost to the gardeners of the Southern States. So many instances of failure and success afford unquestionable proof of the truth of these assertions that verification by specific reference is unnecessary. On the planting of seed, the rearing of crops, in accordance with scientific rules and principles, depend the degree of success which the agriculturalist or gardener is destined to achieve.

In describing the growing of fruits and vegetables in the South in this work, particular stress will be laid on the selection of the proper soil for every fruit and every vegetable in Parts II and III, to enable our readers to select the proper soil for success and avoid failures so often experienced with the wrong kind of soil.

FERTILIZERS.

It is not our intention to bore our readers in this article on fertilizers to any length, because in our description on "How To Grow Fruits and Vegetables" in Parts II and III of this book, we will give complete directions what fertilizers are required for each product and in what quantities to attain satisfactory results. We also give a complete description and

use of fertilizers for the orchard and garden, how to make home-made fertilizers and how to use commercial fertilizers in Part IV of this work. As we stated in the preceding article on soils, that there are many different kinds of soils and each soil has its productive qualities to produce a certain kind of product, so is there many different kinds of fertilizers, producing precisely the same result for different crops. For instance, we require fruit on trees, tomatoes on the tomato vine and potatoes on the potato roots. There are specific manures that bring about these results. We require foliage in lettuce, cabbage, spinach, celery and other foliage plants, such as grass and forage crops; there are certain manures that bring about this result also. To use, then, the opposite manure means opposite results. All these are important features, and chemistry to a certain extent must be studied by the farmer and more especially by the truck grower.

The three foundation principles of all manure, stable manure, night soil, decayed matter of all kinds, are *nitrogen, phosphoric acid and potash.* All other manures, such as lime, green manure from leguminous plants, are valuable only to the extent that they contain all three of the above ingredients or any portion of *nitrogen, phosphoric acid and potash.* All fruits and bulb vegetables contain more potash than any other ingredient. It follows, then, that we must use fertilizers where potash predominates. In foliage plants nitrogen and phosphoric acid are more essential than potash. Nitrate of soda, containing from 15 to 16 per cent. nitrogen, is also a valuable agent to produce foliage plants, and even light fruits, such as the tomato and strawberry. Stable manure contains all the elements of fertilization and could enough be obtained to satisfy the demand there would be no need of studying chemistry or looking in any other direction for other fertilizers, but the supply is limited and we are forced to balance the account by using a combination of ingredients contained in the stable manure commonly known as commercial fertilizers. In our experience for twenty-five years in the Southern gardens we have continually noted that nearly all truck growers especially, do not manure sufficiently, practicing economy where economy actually amounts to a loss. Indeed, we ourselves committed this mistake for years, until we paid a visit to the Northern truck gardens and found to our astonishment in the vicinity of Philadelphia, Pa., Boston, Mass., and Newark, N. J., that the truck gardeners actually spread on each acre every fall from 75 to 100 two-horse loads of rich stable manure to insure one crop of vegetables, and repeat the same for years. It looked to us like growing truck on manure with a little soil mixed in, but it pays there and it would pay in the South. Vegetables to become palatable, tender, juicy and attractive,

must be grown quickly and there is but two agents and that is manure and some more manure. There isn't any doubt but one acre well manured will bring more and better vegetables than any three acres half manured, and if you decide to practise economy, practise it somewhere else outside of the vegetable garden in the way of manuring.

HOW PLANTS GROW.

THE FOUNDATION PRINCIPLES OF SUCCESSFUL CULTURE.

The parts of a garden plant are commonly six—

1st. THE ROOT, growing in the soil, and by its delicate tips taking up the water with its dissolved mineral food.

2d. THE STEM, giving rise through its buds to leaves and flower, and serving as the channel for the soil water to rise to the leaves and for the true sap to return with its supply of sugar, etc., to build the growing parts or be stored for future use (of plant or animal) in stem, leaf, fruit, seed or thickened root.

3d. THE LEAVES, spreading their broad surface to the sunshine and air, and holding in their green cells the living substance which alone has wonderful power to utilize the direct sunlight in producing starch and other foods from the crude soil, water and carbon dioxide of the air.

4th. THE FLOWER, its bright colors and sweet odors, advertisements for the visits of helpful insects (bees, butterflies, etc.); its curious shape a protection against rain and undue heat, as well as against smooth, crawling insects (ant, etc.), which would not bring pollen from the plants, and at the same time, while guiding welcome visitors to the rewarding nectar, compelling them to touch the right place (stigma) with their pollen-dusted bodies.

5th. THE FRUIT. This represents the time and effort of the season. Its bright colors attract and its agreeable and nourishing food rewards the animal which will aid in spreading the seed to new soil or larger room. If not edible, fruits commonly have some device to catch the wind or cling to the covering of visitors (burr.)

6th. THE SEED is within the fruit and protected by it till mature. Within each seed is a germ able to give rise to a new plant resembling its parent; a supply of highly-concentrated food to nourish the baby plantlet till it can feed by leaves and root of its own, and one or more "coats" to protect both during this resting stage.

With this brief outline of the organs of a plant and their functions, let us next consider:

THE SOIL. Recent study of this has laid foundations of a "new agricul-

ture," which contends that the mechanical condition of the soil is of prime importance; that in a well drained, deeply tilled, thoroughly pulverized and mellow soil the roots of a plant will extend so widely as to gather sufficient food from even a relatively small supply, and so deeply as to be almost proof against drouth. The thorough preparation of a deep seed bed saves manure (by admitting the air to liberate plant food) and is really more essential, for without it all may fail.

Drainage must be had to secure this tilth. This is best secured by tile laid at a proper depth, as such drains are never clogged with weeds, ice and snow, and are out of the way. Even land on which no surface water stands will be benefited. The draining prevents surface washing; retains the porous condition left by the frost and permits early and successful pulverizing; allows the air to enter and liberate plant food; invites the roots to strike deeply; absorbs and holds the limited rainfall of summer better and dries the surface quickly after.

Sand in the soil makes it more easily pulverized, but if in excess permits plant food to waste and is changeable in temperature. Such sands need the addition of clay to make them more adhesive and humus (decaying vegetable matter) to retain fertilizers; black soil absorbs the sun's heat and warms down more quickly than sand.

Stiff clays need fall plowing and the addition of sand, or humus in the form of stable manure, muck from swamps or heavy growths of clover, cowpeas, etc., turned to aid the subsoil. Plow, disk and harrow, in pulverizing 8 to 10 inches of soil. Do not hesitate to repeat the plowing several times if needed to bring a deep, mellow soil; but once done, be very cautious about working land when wet or it will again become heavy.

Fertilizers. Not only does coarse material loosen up the soil, but plant food and moisture are also supplied. Long standing crops, whose roots are not used for food (corn, etc.), will thrive on such nourishment if a little quick-acting manure can be applied to enable the young roots to quickly reach it. Root crops (beets, etc.), on the other hand would be distorted and injured by coarse food and thrive best in soils heavily manured the previous season, started by a surface dressing of concentrated fertilizers. Some plants tend to "run to vine" and set fruit too late. In such cases manure in the hill and the check to the growth when that supply is used will induce fruiting.

Cultivation should be deep away from the roots of the plants but shallow near the roots and should be very frequent. Frequent cultivations make more plant food available, keeps the surface loose, which as a mulch holds the moisture, kills the weeds while small and tender, the easiest time to kill them.

THINNING. While it is important to plant sufficient seed to get a good stand, allowing "one for the blackbird, two for the crow, three for the insects, and four to grow." It is also very necessary to thin out well. A certain amount of nourishment is necessary to grow the plant and it must have room, sunshine and air to flourish. One plant too many is as bad as a weed in the hill.

SEEDS AND SEED SOWING.

Like begets like; seeds produce plants and fruits true to the parentage, unless two varieties of the same species are planted closely together and when the pollen of the blooms or flowers are mixed through the agency of winds and insects they produce what is termed hybrids. As a rule hybrids are worthless because they are degenerates from the true strain, the mixture producing abnormally large or diminutive shapes, different textures, colors and in some instances almost nauseating flavors; for instance, when watermelons and cucumbers are grown closely together, the melon will be diminutive in size and lack the bright red colored meat and devoid of all sweetness and flavor; the cucumbers, likewise, abnormally large, of rounder shape, lighter color, smoother skin and without the peculiar cucumber flavor which makes this vegetable a great favorite to so many epicures.

It follows, then, to obtain pure seeds, the law of separation of the parent plant from others of the same species must be obeyed; the pedigree of a seed is as important as the pedigree of a graded animal, and yet through intelligent hybridization of trees and vegetables some of the most valuable acquisitions to the orchard and vegetable garden have been made and being continuously added season after season, all seed growers vying constantly with each other to produce new and useful fruits and vegetables. From the foregoing it must be concluded that pure seeds must be obtained to bring about true and satisfactory results. In Part IV of this book a complete chapter will be devoted to all varieties of seeds, regarding purity, best varieties, how to keep and plant seeds on the farm or garden, and the attention of our readers is respectfully called to that part for further information regarding seeds.

INSECTS.

Insects are the recognized serious enemies to all agriculture, whether on the farm, orchard, garden or poultry yard. The menace of ravages by insects is so great that even the entire earth could be devastated and the

human family and animals annihilated from its face, by a little insignificant insect so small that it might take a million to weigh a pound, but nature throws safeguards around its vegetation in the shape of low temperature, hot sunrays, floods, drouths, which all contribute to check and destroy insect life; then there are multitudes of animals, as fowls, birds, bugs and ants, who use the insects as food and render valuable assistance in checking and exterminating insects, and finally comes man, with his ingenious methods of traps, machines and poisons to complete the safeguards around his crops. Particularly in the last few years the American horticulturist and agriculturist has been confronted with the insect plague as a serious problem to solve. We have only to mention the Hessian fly, green bug, boll weevil, San Jose scale and numerous other insects, to corroborate the above statement. The time has arrived when all culturists must provide remedies for insects to save their crops, the same as they provide seeds, fertilizers, cultivation and land to plant their crops. It is for this reason we devote a special chapter in Part IV for the destruction of insects on the farm, orchard and garden, by describing machines, insecticides, spraying time and what to spray for different crops and different insects and this part of the book should be closely studied, as often *an ounce of preventative is worth a pound of cure* and may be the means of saving an entire crop.

FORCING PLANTS AND FRUITS TO MATURITY.

The modern fruit grower devises many means to force his crop to maturity in the early spring, as the difference in earliness of even a week or ten days ahead of his neighbors or competitors means a considerable increase of profit. He may even realize more profit in those ten days than his competitor will on his whole crop; while it pays to be early in all lines of vocation; this rule certainly holds good in the vegetable and fruit industry.

The most important method employed by market gardeners is the greenhouse or hotbed. The construction of a greenhouse is costly and the artificial heat required by the greenhouse is expensive, therefore the average market gardener arranges hotbeds in which he places fresh stable manure in the bottom and thereby creates a cheap heat which lasts about six weeks or sufficiently long to grow his plants ready for the field when all danger of late frost is over. Sometimes hotbeds are also heated by artificial heat by making a furnace at one end and running a flue under the beds through which the smoke and heat passes, gently warming the beds. Some form of greenhouse or hotbed is today indispensable to the

modern garden and Part IV will contain valuable hints how to construct cheap greenhouses, hotbeds and how to manage them.

There are many other ways to hasten crops, by planting seeds in boxes such as cucumbers and melons, which are hard to transplant. Seeds are also planted right in the field and covered during inclement weather, all which will receive special attention in Part IV of this book.

ROTATION OF CROPS.

It is a fixed law that the same crop can not be grown in succession on the same land for more than a certain period. Every crop has its limit, and this is especially true of fruit and truck, and when the growing of the same crop on the same land is persisted in, diminished crops, insects, blight, rust are the inevitable consequences. Some crops may be grown much longer than others on the same land; on rich new land wheat or corn may even be grown for 40 years or more without much visible diminishment. If you grow cabbage for five years on the same land, the crop will suffer from all kinds of diseases, such as clubroot, root rot and blight. Other vegetables suffer in a like manner and no vegetable of the same species should be grown longer than two seasons on the same land. The older nations, as the Chinese, Japanese, German, English or French, have practised rotation of crops for centuries as a necessity.

The American farmer, backed by rich alluvial soils, has had little occasion to disturb himself about rotation of crops; for decades he planted wheat, cotton and corn on the same land, until now at this time his crops are threatened with extermination by worn-out soils and the insect pest, and like the older nations he will be forced to rotate his crops if he desires maximum results on his farm. A stay of proceedings may be secured by resorting to fertilizing and furnishing the required elements absorbed by each particular crop, but rotation, assisted by fertilizing, will always be found the true remedy to restore both his land and crops to original abundance.

It is not necessary to go to Asia or Europe to observe rotation of crops. In the northeastern part of the United States, where land has been under cultivation for several centuries, rotation of crops is rigidly enforced and practised.

We can not do better than to illustrate the mode of rotation of crops as practised by the Pennsylvania Dutch farmers. The Pennsylvania farms are the highest priced farms in the United States. Very few farms ever offered for sale. The farms as a rule remain as heirlooms in

the same family usually descending from father to the oldest son, or one who shows natural inclination for farm life.

If the farm consists of five hundred acres or fifty acres, it is divided into five lots of equal acreage. In lot one the Pennsylvania farmer will sow his wheat in the fall, and at the same time with the wheat sows timothy or grass seed for subsequent hay crops and pasture; when in July the wheat is harvested, the grass is only a few inches high. As soon, however, as the wheat is cut and the wheat straw removed the young grass, assisted by summer showers, takes a start and produces a fine hay crop in the fall. During mild weather in winter the cattle and horses are turned in the lot, but housed and fed in warm barns every night. This lot remains in hay field and pasture for two years; this lot is then broken in the fall and planted to corn the following spring, restored, rested and enriched by the grass roots, grass being a leguminous crop, calculated to enrich the soil and a splendid crop of corn is made, sometimes exceeding one hundred and fifty bushels per acre. The corn crop on the land is then succeeded by oats. When the oats are harvested, the lot is heavily manured from the year's accumulation on the farm and again sown to wheat and grass Every lot receives a dressing of manure every three years. One lot being in grass two years, it requires five lots to perpetuate this rotation. It will be observed by the above scientific rotation that rotation is the gateway to successful farming and gardening.

HARVESTING AND PICKING FRUITS AND VEGETABLES PROPERLY.

This is an important subject, because much of the profits from the orchard and garden depends entirely upon the science of picking fruits and vegetables at the proper stage, so as to reach market in the right condition. All fruits and vegetables approaching ripeness give but little warning, and experience that teaches us to observe small signs of approaching ripeness in fruits and vegetables is undoubtedly the best teacher, yet by reading a few simple directions the new beginner may reap some knowledge to reach partial success until experience assists further to complete and reward his labor. The picking of all fruits and vegetables at the exact time for distant market is so essential and exact that it might be said that a fruit or vegetable is too green to pick one day, the next day just right, and the next day too ripe for shipping, but would just be right for eating.

All fruits and vegetables, with a few exceptions, will attain their best shape, color and flavor if left to ripen on the tree, bush or vine. All ob-

servers will agree on that point, yet to succeed in shipping the products must ripen in transit in order to reach market in the pink of condition, and for the instruction of our readers we give below a few points about different fruits and vegetables which may prove of good service to succeed in picking at the right time.

Asparagus. Asparagus must be cut four or five inches below the surface, when the slightest break is noticed on the surface of the soil or the asparagus bed.

Beans. Both bush and pole beans should be picked when two-thirds grown, while they are still tender and before the seeds are fully developed.

Cabbage. Cabbage for market should be cut when the heads are hard and solid; never ship a loose or soft head. When cabbage is still soft it is a sign that it is still growing and not matured. Cabbage left too long in the field will burst open and go to seed. During harvest time of cabbage the field should be gone over every day.

Celery. Celery should only be shipped when thoroughly bleached to a rich white or cream color and tender. Celery green, stringy and tough is unsalable in any market.

Egg Plant. Egg plants are comparatively easy to pick at the right time, as the dark blue purple color denote ripenness and egg plants continue in good shipping order for several days.

Melons. Cantaloupes are the hardest fruit to pick at the right time and considerable experience is required to determine the exact moment. If picked just a little too green they will have no flavor; if picked too ripe they will not carry to distant market and must be used for close-by markets. When cantaloupes are about ripe for shipping they will show just the slightest tinge of color between the netting and the button loosens readily with a slight pressure of the thumb, and these are about the only correct signs available. When the cantaloupe drops off the button of its own accord it is just right to eat but too ripe to ship.

Melons. Watermelons when thoroughly ripe are a delicious luxury, when green an abomination and disappointment, especially when the price is high and our expectation raised high for a treat early in the season. Nearly all first cars of watermelons are cut too green. Growers are anxious to get into market first and quite often pick the melon before it is fullgrown. Watermelons are unlike other products; they will not ripen in transit and the green melons hurt the sale of the car and reputation of the shipper.

Many experienced melon pickers can tell a ripe watermelon by the looks; others examine the curl, and when the curl is dead pick the melon. This is often misleading. Others squeeze the melon to hear it crack. This injures the melon for shipping. The best and surest test we ever found is

to sound the melon with the snap of the fingernail. If the sound is hollow and rings the melon is green; if the sound is dead and flat the melon is ripe. Snap the top of your shoe; if the melon sounds the same it is sure to be ripe.

Okra. Okra, in order to be palatable and salable, must be cut daily while young and tender.

Parsley. Parsley for market must be cut while green and before the last sign of yellow appears. Parsley is used mostly for decorating dishes and must be green to sell at all.

Peas. English peas are in demand only when the pods are well filled and green; there is no sale for empty or old yellow shriveled pods.

Onions. When the tops of onions begin to fall, the onions are ready for harvest; they should then be pulled, cured and dried before packing in crates or sacks for market.

Potatoes. Irish potatoes should not be dug until the skin is well set; if dug when the skin slips they are too green and are apt to sour and spoil in the cars during transportation to market.

Spinach. Spinach, like parsley and lettuce, should be cut while tender and green; old and yellow spinach is unsalable.

Tomatoes. Next to cantaloupes, tomatoes are the most difficult fruit to pick at the right stage for market, and yet it is easy to one who has had some practice; most new beginners will pick tomatoes too green; to be on the safe side tomatoes should show a slight tinge of red when picked, and there will be no mistake made if after the tomatoes are gathered they are assorted according to ripenness, then shipping the ripest ones to close-by markets and the greener ones to distant markets.

Beets. Beets will sell well only in early spring, while young and tender and of medium size.

Cauliflower. Cauliflower should be cut and shipped as soon as the bloom is fully developed and while it is yet firm and hard.

Cucumbers. Cucumbers for early market should be picked while still green and crisp; the best selling cucumbers are straight, from five to eight inches long and of a dark green color. Never ship a cucumber that shows the slightest tinge of yellow, as it is too ripe for market.

Corn. Sweet corn must also be gathered at the right time, when it is young and before the grains are fully matured; wormy corn should not be shipped at all.

Garlic. When the tops of garlic begin to droop and show signs of yellowness it is time for the harvest; pull the garlic up and braid in strings garlic.

Lettuce. Lettuce is a very popular vegetable, but must be placed on

the market in a nice, green, crisp condition; there is no sale for old, withered and yellow lettuce. Cut and ship when nice and green.

Mustard. Read lettuce and parsley.

Peppers. Peppers, such as the Bullnose, for salad must be picked as soon as it is grown and still green. Hot peppers for sauce or chili may be left on the bush until completely red or ripe.

Potatoes. Sweet potatoes for immediate use or early shipment may be dug as soon as they are of the required size, but for housing and storing in pits for winter they must be allowed to stay in the ground until completely ripe; if you cut a sweet potato open and a milky fluid appears in drops in the cut part they are not ripe and will not keep for winter use; wait until the cut part stays entirely dry.

Radishes. Radishes, in order to be palatable and in demand, must be grown quickly and should be solid and not pithy. Only gather and ship the best.

Squash. Squash may be shipped as soon as they attain their growth and before they become tough.

Turnips. Large turnips do not sell well, as they are apt to be tough and stringy; for early spring shipment no size sells as well as the medium small, about the size of a dollar; leave the green tops on.

FRUITS.

Apples. Apples for immediate use may be left on the trees until quite ripe; care must be exercised not to bruise the fruit; every bruise means a rotten spot in a short while. Apples for keeping and storing must be even handled more carefully and picked as soon as color of ripenness appears.

Pears. The mellow and soft varieties of pears must be picked before they are ripe for shipment, else they will not carry and arrive too soft; many hard pears (like the Kieffer) should be picked long before they are ripe, as they ripen better in straw or storeroom than on the trees.

Peaches. Peaches for distant shipment should be picked as soon as the first blush of color appears and while they are still hard and unfit for immediate use; they will then ripen in transit nicely for market; softer peaches should be disposed of in the nearby markets or used for canning or evaporating.

Strawberries. Strawberries carry best when picked before they attain their full red color; this does not mean that they should be picked while

green; green berries are valueless on the markets. Like peaches, the overripe berries should be used at home for canning or preserving.

Blackberries. Blackberries are even more tender than strawberries and should be handled only with the greatest care.

How to pack and ship all fruits and vegetables and in what kind of boxes or crates is fully described in Parts II and III of this book.

PACKING FRUITS AND VEGETABLES FOR MARKET.

No fruit or produce dealer or experienced shipper will hardly contradict our statement that the proper selection of fruits and vegetables and packing are by all odds the most important features of successful market gardening and profits in shipping products to market. The minutest detail about a crate or box gauges at once the selling price; the style of box, the bright appearance of the new wood, the neat and proper marking, the careful and substantial nailing are all features which produce pleasant impressions in the eye of the buyer, because they denote a careful and cautious packer.

The shippers of California could never have crossed the continent of nearly 3000 miles to market with any hope of profit if it were not for their scientific artistic packing. All means are exhausted to make every package look as attractive as possible. Who has not admired and was tempted to buy by the inviting rows of pears, peaches, apricots, cherries and grapes as seen in our fruit stores in the exposed California fruit packages. They should convey a lesson to every observing shipper. Then, again, very little, if any, deception is practised by topping off the top with the best; the California package will average good all the way to the bottom and this is most praiseworthy and commendable.

Every shipper has the privilege to make his shipments look attractive by topping with nice fruit or truck, but when this is done for the purpose of deception he deceives only himself. Every strange brand or mark is carefully examined to the very bottom by the buyer before purchase is made, and it is no advantage or benefit to even attempt to deceive the customer for your goods; even should you succeed for one time, the buyer will steer clear of your shipments the next time.

DIRECTIONS FOR PACKING.

Every shipper should have a packing house or shed with a bench about table high, where the products are placed in the shade and in consequence

cool for packing. Now examine your fruits or truck carefully for wormholes, bruises or any deformity; throw away all that show any defects; commencing at the bottom of the box, lay your fruit in rows, gently pressing each piece in its place, until your box is full and protruding slightly over the top; now press the lid on gently and nail. All fruit and truck to carry well must be packed tight. Some experience is necessary to accomplish all this in a neat manner and practice will always be the best final teacher. Many fruits and vegetables are packed in two grades, one marked *fancy* (this means the best), No. two grade marked *choice* and slightly inferior to the first grade, but trashy, wormy, bruised products have no grade and no room in commercial shipping when profit is the object.

If fruit or truck is inferior throw it away in your field. Don't pay a high rate of express or freight on it only to have it thrown away at the other end.

To illustrate the advantage of shipping only the best, an article appeared in our paper some time ago, written by the editor, as follows:

From Southern Shippers' Guide, January 10, 1907.

THROW ONE-HALF OF YOUR CROP AWAY!

Maybe you are a Southern shipper and have reaped some hard experience in the way of getting poor returns for your shipments.

Maybe this is your own fault and not the fault of the commission merchants, the market, or express companies.

Maybe you are a little careless and labor under the impression that anything will sell because it is early.

Maybe you pack everything together, big and little, regardless of color, size and appearance.

Maybe you don't read instructions in your trade papers on how to pack or ship.

If any of the above reasons are true then your poor account sales are your own fault.

Supposing this season you throw a part or one-half of your crop away—we mean, of course, the poor part.

Let us figure a little: Supposing you had enough tomatoes, good, bad and indifferent, to fill ten 4-basket crates full with this mixed lot of good and bad.

You ship the ten crates with the following results:

ACCOUNT SALE:

10 crates at 60c	$6 00
Commission, 10 per cent	60
	$5 40
Express charges, 40c per crate	$4 00
Net proceeds	$1 40

Supposing now you assorted the tomatoes carefully, threw away all the small, wormy and inferior ones and shipped only *six crates.*

ACCOUNT SALE:

6 crates tomatoes at $1.00	$6 00
Commission, 10 per cent	60
	$5 40
Express, 40c per crate	2 40
Net proceeds	$3 00

Any commission merchant will verify our statement that if ill-assorted tomatoes will sell for 60c per crate, good stock assorted would sell for $1.00 per crate.

Now look at the difference in the net proceeds in the account sales. One account sale shows 14 cents net per crate, the other 50 cents net per crate, but this is not all. You have saved the price of your empty crates, nails, labor and hauling, amounting to 15 cents per crate. You have the refuse to can or feed to your stock. You have also created a market for your goods and established a good reputation as a good shipper.

Now what is true of tomatoes is true of all other fruit and truck. It pays to ship less and only the good.

Figure it out for yourself.—*Editor.*

SHIPPING TO MARKETS.

It will be conceded by our readers that the shipping to market of perishable goods like fruits and vegetables must be done with promptness and intelligence; therefore "How to Ship for Profit" becomes an important subject. To haul fruit and produce to the depot for shipment without any advice of the condition of the markets and to unknown commission merchants, to say the least, is a haphazard way of doing business and failure

must naturally follow as often as success. A hit-or-miss proposition is hardly the right way to dispose of property and no experienced shipper will employ such methods. He either ships on advice or orders and generally succeeds. A month or week before his crop is ready for shipment he will study market conditions, write to commission merchants and get advice which is mostly useful and indispensable for success, read trade papers and find out just what competition there is to face. No one will deny that selling the products for cash at the loading station is by far the safest proposition, but this can not always be done. While fruit and produce dealers will always buy carloads at loading stations, very few can be induced to buy small express lots with the high express rates, and therefore express lots and even car lots will have to be shipped on consignment in most instances.

In consigning produce to commission merchants one has three obstacles to contend with: first, delay en route by the transportation companies; second, dishonest commission merchants; and third, overstocked markets. Fortunately for the shipper, there are safeguards at all times available to them that can be employed in all three of these instances. If delayed by the transportation companies for any unreasonable time, the shipper can collect damages to the amount of his loss; for information about the reliability of any commission merchant the shipper can go to his local bank, any merchant at his station, Dun or Bradsteet mercantile agencies, or if he is a subscriber to any regular trade paper he can get the information from the publisher—everyone will serve him. With the use of the telegraph the shipper can avoid overstocked markets by diverting cars to other more favorable markets, or he can hold his crop back a few days until conditions improve. It never pays to rush produce indiscriminately to markets; it is cheaper to even dump the produce at home and save crates and boxes than to ship it to markets where there can not be any profits. It is only by constant, accurate and reliable information that shippers can expect success, and we advise great caution on all occasions in the shipping season. Read our other articles on this important subject in this book.

MARKING SHIPMENTS PLAINLY.

It is of the utmost importance that all shipments should be marked plainly. During shipping seasons commission merchants are very busy people and much of the business falls to clerks who make mistakes, like other people. Shipments arrive broken, unmarked; part of shipment is

delivered to one merchant and part to another. Some check short, and all this should convince the shipper that it is necessary to use caution, like any other business man, and mark every shipment plainly. He would save himself and others much annoyance and get a better opinion of the commission merchant. A rubber stamp with name of shipper, name of town and State, costs but fifty cents, and it is the cheapest thing on earth for the amount of good it does, stamped on the corner of an envelope, will return your letter if lost, or addressee can't be found; stamped on your fruit and vegetable crates, insures accurate delivery, in case of accident, the transportation companies can notify you of your loss or make you return if diverted to other markets, which sometimes happens.

The moral of this story is: Never allow a shipment, box, crate, basket, bag or any other package, go out of your hands, if shipped by express or freight, unless your name, town, State and the merchant's name is plainly marked on every package.

CARELESSNESS OF SHIPPERS.

On our visit to New York a commission merchant, whom we know to be one of the most reliable men in the business, showed us an envelope in which were checks aggregating $600, made out in blank, and account sales for produce received in a single month from shippers who had neither sent any mail advices of their shipments nor marked the packages with their names and addresses. In some cases, the names but not the addresses were given, in most cases neither.

Another commission merchant received a package of butter by express with no marks to show the consignor. He took the trouble to write the express agent at the office from which it was received, thinking he would know the shipper. But the agent said he found the tub, properly marked as far as destination was concerned, on the platform when he returned from lunch, so he sent it on, but no one had ever appeared to stand sponsor for it.

We hope the foregoing will impress our readers with the importance of always marking shipments *plainly.*

DIFFERENT BOXES, CRATES OR HAMPERS TO USE FOR EXPRESS AND CAR LOT SHIPMENTS OF VEGETABLES.

Asparagus.—Boxes holding one dozen bunches by express; in carloads bushel boxes may be used.

String Beans.—By express, one-third bushel boxes and one-half bushel baskets; carloads, one-third bushel boxes, bushel crates or hampers may be used.

Cabbage.—By express or carloads, standard open crates, 20x20x28 inches.

Celery.—By express or carloads, bushel boxes holding 3 dozen bunches, each bunch containing 12 plants of celery.

Egg Plant.—By express, bushel crates or hampers; by carloads, either barrels or hampers.

Melons, Cantaloupes.—By express, standard crates, 12x24, holding 45 melons; carloads the same; pony crates or Climax baskets are sometimes used, holding each eighteen melons, by express with good results.

Melons.—Watermelons can only be shipped in car lots with any degree of success and profit.

Watermelons should be loaded in ventilated cars. Clean stock cars are as good as any. Never load in a dirty car. Place about 10 inches of straw, hay or pine shavings on the bottom of car. Now place every melon carefully and snugly in its place, commencing at the ends of the car and finishing at the doors. Allow no one to walk over the melons. Load the car about one-half or less full in height. When loading, carefully examine every melon for soft places. Throw out every one that shows any defect. It is better to throw the melon away at loading than to throw it away at the receiving point, after paying freight charges on the melon.

Okra.—Okra is best shipped by express, in one-third bushel boxes or one-half bushel baskets; never ship okra in sacks.

Parsley.—Ship parsley only in hampers, bushel boxes or barrels, well iced with cracked ice throughout the barrels in layers.

Peas.—For best results ship English peas in one-third bushel boxes, hampers, or one-half bushel boxes. Peas are very apt to heat and should not be shipped in barrels or large packages.

Potatoes.—Irish potatoes should invariably be shipped in carlots, in new standard sacks holding about 100 pounds each, never in old or dilapidated sacks. In the first part of the season Irish potatoes may be shipped in one-third bushel boxes by express with profit; in carlots, ventilated barrels may also be used.

Spinach.—Spinach can be shipped in bushel boxes or hampers in carlots and in bushel boxes and barrels, well iced with cracked ice, by express.

Tomatoes.—The standard crates for tomatoes in carlots or express are either the six-basket or four-basket crate.

Beets.—Beets tied in bunches may be shipped in hampers or bushel boxes without ice, or barrels with cracked ice, by express. Beets shipped in carlots must be shipped in refrigerator cars, well iced, as they are very apt to heat.

Cauliflower.—Cauliflower should be shipped in bushel boxes or hampers without ice, or barrels well iced, by express.

Cucumbers.—In the first part of the season cucumbers may be shipped by express in one-third bushel boxes; later on when they become more plentiful, in bushel boxes, hampers or barrels; no icing is required by express shipments. In carlots, cucumbers may be shipped in barrels or bushel boxes in a well iced refrigerator car.

Corn.—Sweet corn is very apt to heat in transit and must be shipped in small packages like the hampers or bushel boxes; in barrels by express. Green corn must be well iced with cracked ice.

Garlic.—When garlic is thoroughly dry and cured it may be shipped by freight or express in barrels or bushel boxes.

Lettuce.—Lettuce by express should be shipped in hampers or bushel crates without ice. In barrels it must be well iced. In carlots lettuce can only be shipped in well iced refrigerator cars.

Mustard.—Mustard by express should be shipped in barrels well iced.

Onions.—The Bermuda onions grown in the South are shipped with best success in the Cummer folding crate holding about one bushel or fifty pounds. It is a risky business to ship any onions from the South in sacks and we can not advise sacks for shipments; crates or even barrels give better results.

Peppers.—Green peppers should be shipped in one-third bushel boxes only by express; dry peppers thoroughly seasoned and cured may be shipped in sacks by express.

Potatoes.—Sweet potatoes should always be shipped in barrels or sacks either by express or carlots.

Radishes.—Radishes are a difficult crop to ship as the tops are very apt to heat and spoil the sale of the radishes. Radishes may be shipped in small packages like one-third bushel boxes or one-half bushel baskets by express; when shipped in hampers or barrels they must be well iced with cracked ice put in layers in the barrels or hampers. In carlots radishes are usually shipped either in bushel boxes or barrels in refrigerator cars, well iced and re-iced in transit.

Turnips.—Turnips with the tops should only be shipped in barrels by express, well iced.

FRUITS.

Apples are packed either in standard apple barrels or boxes containing about one bushel. It has been demonstrated that it is more profitable to pack apples in boxes than barrels; the boxes are more convenient to handle and stack closer in the cars and storage, and are also preferred by the retail trade. There is no question but that boxes in time will take the place of barrels for packing apples.

Pears.—Pears are preferable packed in one-bushel boxes, except the harder cooking varieties, which may be safely packed in barrels. Hampers also make a neat package for pears.

Peaches.—Peaches, except the California, which are packed in flat boxes containing about one-half bushel, are best packed from the Southern States for Northern markets in either six-basket or four-basket crates.

Apricots.—Apricots should also be packed in either four or six-basket crates.

Plums or Persimmons may be safely packed and transported to market in strawberry crates containing 24 quart boxes, or one-third bushel boxes; four-basket crates may also be used for plums or persimmons to good advantage; larger packages are undesirable for plums.

Oranges.—Oranges and grapefruit are invariably packed in the standard orange crates.

Figs.—Ripe figs for raw consumption carry best in strawberry crates containing 24 quart boxes; four-basket crates can also be used.

Grapes.—Grapes are usually packed in the regular grape baskets. Grapes also show up well in the four-basket crates, and this is a very desirable package for grapes.

Strawberries.—Strawberries are packed either in crates containing 24 quarts or in crates containing 24 pints; either makes an attractive package, but quarts are more generally used.

Dewberries and Blackberries.—For these berries, see strawberries.

Pecans.—Pecans are shipped in carlots or less in 100-pound sacks; barrels can also be used.

Walnuts.—In sacks, like pecans.

HOW TO MAKE AND CONSTRUCT PACKAGES FOR SHIPMENTS.

We stated before in our article on packing that the neat appearance of a box has decided influence on the sale of the goods. Crates and boxes should be well nailed on all sides. Boxes and crates are often roughly

handled, and every broken box means a loss to the shipper. Nails should be long enough to hold and when driven with the grain of the wood should be slightly slanting; in that position they will hold much better. A nail driven straight with the grain of the wood will pull out on the slightest pressure.

Care should also be exercised that the points of the nails do not protrude from the edges or sides of the boxes. Crates and boxes of fruits and vegetables are often transferred from one car to another in a hurry at night, and to have nail points sticking out is a very dangerous proposition for the handlers; therefore for humane reasons, if for no other, all crates and boxes should be nailed securely. It is not advisable to use old weather-worn or soiled box lumber; only the bright and clean box or crate has an inviting appearance.

To ship fruits or vegetables in soap or shoe boxes or any old box is time and labor thrown away; the trade does not take kindly to such questionable receptacles.

HOW TO SHIP BY EXPRESS.

In the first place, read our instructions on different crates or boxes to use for express shipments. To use crates of doubtful capacity is mystifying to the purchasers and express agent. It pays to use only standard crates. Next read our article on packing. Any fruit or truck that is not *the very best selected and packed* can not stand the express charges, especially to interstate points.

Then ask your express agent for an express book to keep a perfect record of every shipment you make. Several weeks before your crop is ready to ship read market reports in any trade paper published in the interest of shippers, and which gives you information where to ship and to whom to ship.

No one can expect to succeed unless supplied with late data about market conditions. To ship blindly, either by express or otherwise, means loss, as express charges are high. Mark your boxes very plainly with your name and station and for whom the shipment is intended at destination. It is a good plan to mark both ends—it saves much useless handling and turning over by express employes.

Large cities like St. Louis, Chicago, New York, Boston, etc., are supplied with most fruits and vegetables in carload lots, which can be sold much cheaper. It is perfectly useless to make express shipments to compete with carlots, as express charges eat up all profit. Hunt small markets. They are the most profitable for express shipments.

It is also a good plan in shipping by express to divide up the shipments and not ship all to one market. Express shipments to Northern, Eastern and Western markets move at the rate of about five hundred miles in 24 hours, including stops and transfers. All of the fruits and vegetables must be picked and shipped in the stage of ripeness to conform as nearly as possible to the time it takes to reach the markets. Many fruits and vegetables shipped by express must be also iced according to that time, and every shipper should become familiar with distances, in order to ship intelligently and with profit by express.

HOW TO COLLECT OVERCHARGES FROM EXPRESS COMPANIES.

It is quite frequently that overcharges are made by express agents, and these must be looked after by the shippers. Every shipper that expects to make a success must post himself in regard to weights, estimated weights and rates. Both the interstate commerce law and State laws compel all common carriers, express companies included, to keep on file all of the tariffs to all points, for the inspection of the general public; shippers should insist upon examining the rates and become familiar with the same.

When an account sale is received from the commission merchant, examine the same closely; if there is any overcharge above the authorized rate, make out a bill for the amount and present the same, with the account sale attached, to your local express agent. The rules and regulations of all express companies require the agent to present the claim to the auditing department and get the overcharge refunded to the shipper. If payment of overcharge is refused by the express companies, suit for the amount may be instituted in the local courts for recovery of the overcharge and costs of court.

ESTIMATED WEIGHTS

AS PROMULGATED BY THE RAILROAD COMMISSION OF TEXAS FOR EXPRESS SHIPMENTS, EFFECTIVE NOVEMBER 1, 1905.

These estimated weights only apply between points in Texas.

FRUITS.

Estimated weights:	For use unless actual weight is less:
Apples, per standard barrel	150 lbs.
Apples, 1-3 bushel box	15 lbs.
Berries and figs, 24 quart crates	25 lbs.

Lemons, boxes 14x13x27 inches	80 lbs.
Oranges, boxes 14x13x27 inches	70 lbs.
Peaches, 1-3 bushel boxes	18 lbs.
Peaches, 1-4 bushel boxes	12.5 lbs.
Peaches, 4 baskets (1-8 bushel each) crates	20 lbs.
Pears, 1 bushel boxes	40 lbs.
Pears, 1-3 bushel boxes	15 lbs.
Pears, Climax baskets	15 lbs.
Plums, 4 basket (1-8 bushel each) crates	20 lbs.

VEGETABLES.

Subject to tariff rates, and the following estimated weights unless actual weight is less:

Beans, 1-3 bushel box or basket	10 lbs.
Beans, 1 bushel box or basket	30 lbs.
Beets, with tops, flour barrels	90 lbs.
Beets, with tops, sugar barrels	110 lbs.
Beets, with tops, crates 16x16x26 inches	50 lbs.
Beets, without tops, flour barrels	110 lbs.
Beets, without tops, sugar barrels	125 lbs.
Cabbage, in crates 20x20x28 inches	100 lbs.
Carrots, with tops, flour barrels	90 lbs.
Carrots, with tops, sugar barrels	110 lbs.
Carrots, with tops, crates 16x16x26 inches	50 lbs.
Carrots, without tops, flour barrels	110 lbs.
Carrots, without tops, sugar barrels	125 lbs.
Cauliflower, flour barrels	85 lbs.
Cauliflower, crates 12x18x24 inches	50 lbs.
Cucumbers, 1-3 bushel	15 lbs.
Cucumbers, 1-2 bushel	20 lbs.
Cucumbers, 1 bushel	40 lbs.
Cucumbers, 1½ bushel	70 lbs.
Cucumbers, flour barrels	150 lbs.
Cucumbers, sugar barrels	200 lbs.
Egg plant, crates 12x12x24 inches	40 lbs.
Egg plant, flour barrels	90 lbs.
Egg plant, sugar barrels	110 lbs.
Lettuce, flour barrels	60 lbs.
Mixed vegetables, flour barrels	90 lbs.
Mixed vegetables, sugar barrels	100 lbs.
Mixed vgetables, crates 16x16x26 inches	50 lbs.

Mustard, flour barrels	60 lbs.
Mustard, sugar barrels	70 lbs.
Okra, 1-3 bushel	10 lbs.
Okra, 1 bushel	30 lbs.
Onions, green, flour barrels	60 lbs.
Onions, green, sugar barrels	70 lbs.
Onions, 1-4 bushel	15 lbs.
Onions, 1-3 bushel	20 lbs.
Onions, 1 bushel	60 lbs.
Onions, flour barrels	150 lbs.
Parsley, flour barrels	60 lbs.
Peas, 1-3 bushel	10 lbs.
Peas, 1 bushel	30 lbs.
Peppers, 1-3 bushel	10 lbs.
Peppers, 1 bushel	30 lbs.
Potatoes, 1-4 or 1-3 bushel	15 lbs.
Potatoes, 1 bushel	60 lbs.
Potatoes, flour barrels	150 lbs.
Radishes, with tops, flour barrels	90 lbs.
Radishes, with tops, sugar barrels	110 lbs.
Radishes, with tops, crates 16x16x26 inches	50 lbs.
Radishes, without tops, flour barrels	110 lbs.
Radishes, without tops, sugar barrels	125 lbs.
Spinach, flour barrels	60 lbs.
Squash, 1-4 bushel	12½ lbs.
Squash, 1-3 bushel	15 lbs.
Squash, 1 bushel	40 lbs.
Squash, flour barrels	130 lbs.
Tomatoes, 1-3 bushel	18 lbs.
Tomatoes, 4-basket crates	20 lbs.
Turnips, with tops, flour barrels	90 lbs.
Turnips, with tops, sugar barrels	110 lbs.
Turnips, with tops, crates 16x16x26 inches	50 lbs.
Turnips, without tops, flour barrels	110 lbs.
Turnips, without tops, sugar barrels	125 lbs.

"Radishes, beets, mustard, turnips, spinach, lettuce, onions, carrots, colliards and parsley, in crates 12x12x22 or 16x16x22 inches, where ice is used for preservation, rate shall be assessed on weight 20 per cent less than actual gross weight."

Fruit and vegetable empties (not refrigerators), N. O. S., which have contained berries, fruits or vegetables, may be returned to the original shipper at the following rates:

36 quart capacity or less	5c each
More than 36 quart capacity	10c each
When nested, merchandise pound rates	Rule 14

It must be understood that these estimated weights do not apply to any interstate points. The Interstate Commerce Commission has not established any estimated weights on interstate shipments by express, but have issued special package rates on fruit and vegetables, effective May 8, 1907, a copy of which is required by law to be posted in every express office of the United States for the inspection of shippers.

HOW TO SHIP BY FREIGHT.

Very nearly all the fruits and vegetables shipped by freight are shipped in solid or mixed carlots, although we think a great deal of our heavy produce should be shipped by local freight in State shipments, as the cost is much less. To give an idea of the relative cost of express and freight charges, let us cite as follows: The express charge from Texas points to the city of Chicago is $3 per 100 pounds. The freight charge in carlots is 50c per 100 pounds. A bushel of cucumbers weighs 50 pounds. Suppose a bushel of cucumbers would sell for $1.50 per bushel in Chicago. The shipper would get nothing in return by express, yet he would get 95c per bushel for his cucumbers if shipped in carlots, 30c being deducted for icing charges and commission. It follows that very little can be shipped by express to large cities with carlots to compete. Cars of fruits and vegetables must only be loaded by experienced loaders, which most of the refrigerator companies furnish. The minimum weight of a carload, as accepted by railroads, is 20,000 pounds. This means you must pay for 20,000 pounds, even if you put in less. If you put in more you will be charged for the excess at regular rates. Peaches, tomatoes, beans, cucumbers, cantaloupes, all fruits and mixed vegetables must be shipped in refrigerator cars, well iced. An additional charge is made for this service. Watermelons, potatoes and onions can be shipped in open ventilated cars without ice. Never overload a car. You gain nothing in freight rates and it only adds to the risk of the produce spoiling en route. Obtain a bill of lading, stating that contents are in good order, and have it stated on bill of lading where re-icing should take place.

QUANTITY OF PRODUCE REQUIRED TO MAKE A CARLOAD OF TWENTY THOUSAND POUNDS.

FRUITS.

Apples.—125 barrels; 500 boxes.
Berries.—600 crates.
Lemons.—300 boxes.
Oranges.—384 boxes.
Peaches.—1000 four-basket crates; 800 six-basket crates.

VEGETABLES.

Beans.—String beans, 1500 one-third bushel boxes; 500 bushel boxes.
Cabbage.—200 standard crates 20x20x28.
Melons, Cantaloupes.—400 standard crates 12x12x24.
Melons, Watermelons.—Average weight 20 pounds, 1000 melons.
Potatoes, Irish.—200 sacks.
Tomatoes.—1000 four-basket crates; 800 six-basket crates.
Cucumbers.—400 bushel crates.
Onions.—400 bushel crates.

All of the above means minimum weight of 20,000 pounds to the car. The shipper at his option may load cars heavier, but an additional cost of freight must be paid.

HOW MANY ACRES OF FRUIT OR TRUCK MUST BE PLANTED TO SECURE CARLOTS DAILY.

The question of how much should be planted to secure carlots promptly is an important one to the grower who desires to load cars, as delays in loading cars for several days means always a proportionate loss, as some of the produce loaded first will be old and wilted, if not spoiled, when reaching the markets.

Most any one acre of melons, cantaloupes, cabbage, cucumbers or onions will produce a full car in about thirty days, but to secure a carload every day a proportionate number of acres must be planted. To make this perfectly plain, let us assume that an acre of cucumbers will produce 400 bushels in 30 days; this means thirteen and one-third bushels per acre per day, and 30 acres would be required to produce 400 bushels every day—sufficient to load a car every 24 hours. The above is a low estimate,

but to be on the safe side plant 30 acres of cucumbers if you desire to load cars every day.

To secure carloads every day of the following produce, plant:

Beans (String beans).—25 acres.
Cabbage.—40 acres.
Celery.—15 acres.
Cantaloupes.—25 acres.
Peas (English).—20 acres.
Potatoes (Irish).—30 acres.
Potatoes (Sweet).—25 acres.
Tomatoes.—40 acres.
Beets.—30 acres.
Cauliflower.—40 acres.
Cucumbers.—30 acres.
Corn (Sweet).—35 acres.
Lettuce.—15 acres.
Onions.—25 acres.
Radishes.—20 acres.
Turnips.—20 acres.
Watermelons.—40 acres.

The above table will be found very useful to truck growers or associations that desire to plant sufficient acreage to insure prompt carload shipments.

TO ICE CARS OR LOCAL EXPRESS SHIPMENTS.

As a rule the refrigeration or railroad companies into whose cars the fruit and produce is loaded furnish experienced loaders to see that the packages are properly fastened in the car, also to attend to the icing of the car, and the shipper is usually relieved of any labor about icing or other matters.

As the shipper is as much or more interested in the welfare of the cars than the transportation companies, he should see that every car is properly iced at starting point before leaving, and have it specified on bill of lading that the cars must be re-iced at all re-icing points.

Five tons is about the proper amount of ice, 2½ tons in each bunker at the ends, that should be placed in the cars at the shipping point, and the car must be re-iced every 24 hours while en route, or else there is every prospect of a spoiled car.

ICING EXPRESS SHIPMENTS.

The icing of express shipments must be done in the packages with cracked ice laid in layers between the produce. The amount of ice required is gauged by the distance the shipment is to travel and time consumed. A block of ice in the center of the barrel is no protection; as we stated before the ice must be cracked and scattered in layers throughout the barrel.

Lettuce, beets, radishes, spinach, green onions, parsley, carrots and mustard shipped by express in barrels, hampers or crates must all be iced thoroughly to insure safe delivery to market.

TIME REQUIRED BY CARLOADS TO REACH MARKETS.

From observations we find that cars of perishables under fast freight schedules, including all stops for re-icing and transfer switches, travel about fifteen miles per hour and this is considered good time. Some railroads, operating special fruit and vegetable trains, even exceed that speed, but most roads show much less speed, and there is really no fixed time to depend on in freight movements. We have seen a car go from South Texas points to Chicago, Ill., in four days; the very next car consumes nine days over the same route.

To avoid losses by delays en route, shippers should file car numbers and when the car has not been reported arriving at the proper time, request the railroad agent at the shipping point to send tracer after the car; often losses may be avoided by prompt actions.

THE USE OF MAIL, TELEGRAPH AND TELEPHONE FOR MARKET QUOTATIONS AND SHIPPING.

Both mail and telegraph service are indispensable during shipping season, as often a single message may avoid a loss of hundreds of dollars. The main points are the condition of markets and movement of cars. When a shipper keeps a perfect record of his car and knows about what point the car should be at, he can, upon learning that the market for which his car was originally destined is becoming overstocked on the class of products in his car, divert his car or cars to more favorable markets. On the through rate this privilege is accorded to shippers by all railroad companies, and every railroad agent at shipping points has instructions to furnish shippers with all necessary information for the prompt diversion

of cars. It is therefore obvious that liberal use of telegraph facilities is advisable on all occasions.

PAYMENT FOR TELEGRAMS.

Numbers of shippers are in the habit of sending many telegrams collect to commission merchants, asking about market quotations. This is a hard tax on the commission merchant and should not be indulged in. If the information asked for in the telegram is for the benefit of the sender of the telegram, the telegram should be paid for by the sender. This is a common rule among all business men and should be strictly adhered to.

SHIPPING RULES AND GRADES.

Today's shipment means shipment before midnight, or on next train due to leave after order by telegraph or letter has been received.

Immediate shipment allows twelve hours.

Prompt shipment allows twenty-four hours.

The date on bill of lading constitutes evidence for compliance of order.

Shipment of potatoes from the South shall be allowed a shrinkage of 3 per cent of the gross weight and cabbage 6 per cent.

Complaints as to weight, shortage of grades must be filed and shipper notified within thirty-six hours.

F. O. B. SALES.

F. O. B. sales means the goods must be paid for when loaded and before it leaves the shipper's station. The same rule applies if the buyer diverts the car to other points. With the consent of the shipper drafts F. O. B. may be paid upon arrival of car at destination.

ADVANCE ON CONSIGNMENT.

Advance on consignment is payable at any time when requested, even before the car is loaded or rolling. Advances on consignments may be made on growing crops and crops to be bought for the consignee.

JOINT ACCOUNT.

Joint accounts means profits and losses alike to shipper and consignee. Mutual contracts between the parties concerned must be drawn and reduced to writing, properly witnessed.

DOCKAGE.

Dockage means shortness of the car or shipment, by theft, decay, short

weight or an excess of dirt or foreign matter in the products. The amount of dockage may be agreed upon by both parties interested.

A refused car is one subject to the order of the shipper.

If a car arrives and is not immediately inspected by the consignee and then refused, the consignee is liable for the damage.

Notice of rejection must be wired to the shipper within twelve hours after arrival of the car.

If the car is switched on the private track of the consignee it means acceptance of the car.

BROKERAGE RULES.

A broker cannot claim brokerage on a rejected car unless he succeeds in selling the car to other parties, with the consent and satisfaction of the shipper.

The usual brokerage charges are five dollars per car.

UNDER HEAD OF GRADES.

Potatoes.—No. 1 or fancy potatoes shall be true to variety, and none shall be less than two inches in diameter.

No. 2 or choice shall mean mixed potatoes as to variety, but all of one color and none less than 1½ inches in diameter.

GRADES OF FRUITS AND VEGETABLES.

All fruits or vegetables shipped in carlots or in express shipments should be strictly graded according to appearance, size and color, because fruit and produce, all mixed up together—good, bad and indifferent—is not salable, and if sold at all, the grade is established *as the lowest grade in the package.* It must be quite plain to the shipper, in order to derive the benefit of his good produce, he must keep it separate from the bad. With a few exceptions in fruit and produce, there are three grades—*fancy, choice and culls.* To mix all three together means *culls,* and will be sold as such, as there is no grade established on the market for mixtures. To assist shippers in establishing grades we give below a table on each fruit and vegetable according to rules familiar to and exacted by the trade.

Apples.—The standard for size for *Number One* apples shall not be less than two and one-half inches in diameter and shall include only standard varieties. Number One apples shall be, at the time of packing, free from worms, defacement of surface; shall be hand-picked from the tree, a bright and good color and shapely form.

Number Two apples shall be hand-picked from the tree; shall not be smaller than two inches in diameter. The skin must not be broken or the apple bruised.

Apples unfit for either Number One or Number Two grades should be converted into cider or stock food.

Beans (String beans).—No. 1 string beans must be straight, stringless and free from any rust spots. No. 2 may be smaller, but must be tender and palatable and free from black rust. Culls, no demand.

Cabbage.—No. 1 cabbage heads should average five pounds, solid and free from lice.

No. 2 includes cabbage of all sizes, either too large or too small. No sale or demand for soft heads.

Cucumbers.—No. 1 cucumbers should be straight, of dark green color and about eight inches long.

No. 2.—Odd lengths, but straight and green, grade as No. 2. Culls of cucumbers are twisted, crooked and of round shape, but not yellow. No sale for yellow.

Cucumbers for pickling, cucumbers 1½ inches long grade as No. 1, 2 inches long as No. 2, and 3 inches long as No. 3.

Cantaloupes.—No. 1.—Cantaloupes grade as No. 1 only when 45 cantaloupes just fill a standard crate 12x12x24.

No. 2.—Odd sizes, larger or smaller, grade as No. 2. All cantaloupes must be well netted. No demand or sale for smooth or slick cantaloupes.

Onions.—No. 1 onions are of medium size, averaging about three inches in diameter, small stems and of bright color.

No. 2 are large and small mixed together, but of bright color and unsprouted. Sprouted onions may be trimmed and sold as culls.

RED RIVER VALLEY POTATO ASSOCIATION GRADES.

No. 1 Red River Ohios—Shall be Ohios grown in the Red River Valley, true to name,, reasonably free from scab, ripe, smooth and sound, clean according to season, sorted by running over a one and three-fourth-inch screen.

No. 2 Red River Ohios—Shall be Early Ohios grown in the Red River Valley, true to name, ripe and sorted over a one and one-half inch screen.

Culls—Red River Ohios—Shall be Early Ohios, true to name, sound and clean, consisting of small potatoes sorted out of Nos. 1 and 2.

Triumphs—Shall be graded the same as Ohios, except that No. 1 shall be sorted over a one and one-half inch screen.

PEACH GRADES.

Michigan Peach Grades.—Fancy XXXX.—Peaches 2 inches and upwards in size, perfect in every respect, highly colored, carefully packed, suitable for long distance shipment.

XXX.—Peaches that are 1¾ to 2 inches in size, smooth, sound, well matured and colored, suitable for shipment long distances, well packed.

XX.—Peaches that are 1½ to 1¾ inches in size.

Culls.—All that are 1½ inch and less in size.

Texas and Arkansas Peach Grades.—Choice peaches shall be of uniformly large size, the variety quoted, smooth and sound, free from blemish, carefully picked and packed in four or six-basket crates, fit for shipment to distant markets.

No. 1 peaches of medium to large size, smooth and sound, packed same as choice.

No. 2 peaches, uneven in size, some slightly over-ripe and defective and not good enough for No. 1, but that will stand shipment to nearby markets.

Pecans.—All pecans are graded according to size and softness of shells.

No. 1.—Uniform large size, soft shells and shells well filled, free of worms.

No. 2.—Medium size grade; must run even.

No. 3.—Small or mixed lots, hard and soft shells.

Pears.—No. 1.—Soft varieties for eating purposes, even size and good color. California packs in standard boxes containing 100 pears.

No. 2.—Irregular sizes, but of good flavor and color.

No. 3.—Cooking pears rank as No. 3; must be sound and free of wormholes.

Plums.—No. 1.—Plums are only salable as No. 1 grade. They must be of even size, good color and sound. No demand or sale for green, soft or wormy plums.

Oranges.—No. 1 or fancy are of medium size, bright and sound.

No. 2 grade consists of large or small sizes and Russets.

Grapes.—No. 1.—Large, well-colored bunches and sweet flavor.

No. 2.—Small bunches, irregular sizes, but of sweet flavor. There is no grade for sour grapes or any demand.

Tomatoes.—No. 1 tomatoes are of even size, smooth and without any blemish, and every tomato must show some color to be classed as No. 1 or fancy.

No. 2.—Irregular sizes, but well formed, showing some color. Culls of tomatoes or wormy ones are unsalable.

Strawberries.—No. 1 grade is based as follows: Berries must be of good red color, firm, free from rot or blemish, boxes well filled, and berries laid even on surface of quart.

No. 2.—Berries of lighter color than No. 1 grade, free from rot or

blemish, good even run in size, may be some softer than No. 1, but firm enough to carry well to markets.

No. 3.—Smaller size berries, both red and light color, of any variety, not suited to be placed with No. 2 or No. 1 grades, free from rot or extra soft berries, but may contain some berries softer than No. 1 or No. 2 grade, boxes well filled.

It should be the intention of all shippers and associations not to allow any berries to go in either of these grades that the boxes are not well filled, or that may contain enough berries of any description that would injure the balance of the fruit in the box.

GRADES OF HAY AND STRAW ADOPTED BY THE NATIONAL HAY ASSOCIATION.

Choice Timothy Hay—Shall be timothy not mixed with over one-twentieth other grasses, properly cured, bright natural color, sound and well baled.

No. 1 Timothy Hay—Shall be timothy with not more than one-eighth mixed with clover or other tame grasses, properly cured, good color, sound and well baled.

No. 2 Timothy Hay—Shall be timothy not good enough for No. 1, not over one-fourth mixed with clover or other tame grasses, fair color, sound and well baled.

No. 3 Timothy Hay—Shall include all hay not good enough for other grades, sound and well baled.

No. 1 Clover Mixed Hay—Shall be timothy and clover mixed, with at least one-half timothy, good color, sound and well baled.

No. 2 Clover Mixed Hay—Shall be timothy and Clover mixed, with at least one-third timothy, reasonably sound and well baled.

No. 1 Clover Hay—Shall be medium clover, not over one-twentieth other grasses, properly cured, sound and well baled.

No. 2 Clover Hay—Shall be clover, sound, well baled, not good enough for No. 1.

No Grade Hay—Shall include all hay badly cured, musty, stained, threshed, or in any way unsound.

Choice Prairie Hay—Shall be upland hay, of bright color, well cured, sweet, sound and reasonably free from weeds.

No. 1 Prairie Hay—Shall be upland, and may contain one-quarter midland of good color, well cured, sweet, sound and reasonably free from weeds.

No. 2 Prairie Hay—Shall be upland of fair color, or midland of good color, well cured, sweet, sound and reasonably free from weeds.

No. 3 Prairie Hay—Shall be midland of fair color, or slough of good color, well cured, sound and reasonably free from weeds.

No. 4 Prairie Hay—Shall include all hay not good enough for other grades, and not caked.

No Grade Prairie Hay—Shall include all hay not good enough for other grades.

No. 1 Straight Rye Straw—Shall be in large bales, clean, bright, long rye straw, pressed in bundles, sound and well baled.

No. 2 Straight Rye Straw—Shall be in large bales, long rye straw, pressed in bundles, sound and well baled, not good enough for No. 1.

No. 1 Tangled Rye Straw—Shall be practically free from chaff, of good color, sound and well baled.

No. 2 Tangled Rye Straw—Shall be reasonably clean, may be stained, but not good enough for No. 1.

No. 1 Wheat Straw—Shall be practically free from chaff, of good color, sound and well baled.

No. 2 Wheat Straw—Shall be reasonably clean, may be some stained, but not good enough for No. 1.

No. 1 Oat Straw—Shall be practically free from chaff, of good color, sound and well baled.

No. 2 Oat Straw—Shall be reasonably clean, may be some stained, but not good enough for No. 1.

PART II.

VEGETABLES.

THE SOUTHERN VEGETABLE GARDEN.

A Full Description of all Vegetables Grown for Home Use and Shipment to Northern, Eastern and Western Markets.

Selections of Soils and Seeds; Fertilizers Required by Each Vegetable. Sowing the Seed. Cultivation. Protection Against Insects.

VEGETABLES.

A complete treatise on how to grow all vegetables for home use and shipment to Northern, Eastern and Western markets, comprising selection of soils, seeds, fertilizers, cultivation required by each vegetable, sowing the seeds, harvesting, and packing ready for market.

Asparagus
Beans (Bush)
Beans (Pole)
Beets
Cabbage
Cassava
Carrots
Cauliflower
Celery
Collards
Cucumbers
Egg plant
Garlic
Horseradish
Kale
Kohlrabi
Leek
Lettuce
Melons (Cantaloupes)
Melons (Watermelons)
Mustard
Okra
Onions (from seed)
Onions (from sets)
Oyster plants
English peas
Parsley
Parsnips
Peppers
Potatoes (Irish)
Potatoes (sweet)
Pumpkins
Radishes
Rhubarb
Rutabagas
Spinach
Squash
Tomatoes
Turnips
Tobacco

HOW TO GROW, PACK AND SHIP ASPARAGUS.

Asparagus is one of the earliest spring vegetables and if properly cultivated heads the list of all vegetables for profit; once established and taken care of, an asparagus bed is a constant source of income for over twenty years. It is a vegetable of excellent flavor, taste much resembling green peas, and it is preferred by many to peas and all other spring vegetables. Always in demand in every market at remunerative prices, even sold sometimes at 25 cents per pound. In thirty years of trucking we have never known an overstocked market in the early spring, when the Southern grower can put this remunerative vegetable on the markets of the North, East and West. California is a competitor on this vegetable, but not a serious one, because the distance is too great to the principal markets, and the Southern grower has every advantage to grow, ship and sell asparagus in his own home market. Asparagus is not difficult to grow, and by following our simple directions every truck grower and amateur can grow asparagus with gratifying results.

SOIL.

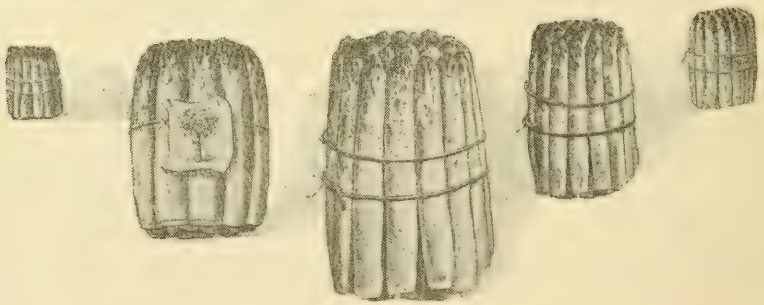
Asparagus will grow in almost any ground and yield large crops, even on stiff soils, but for market gardening a light sandy soil, fairly fertile, is much to be preferred, both for the sake of earliness in producing marketable shoots and for ease of cultivation.

CULTIVATION AND PLANTING.

As the asparagus crop will occupy the land for years after planting, the preparation should be thorough, beginning by deep plowing to bring the soil in as high a state of cultivation as possible. There are two distinct ways of propagating asparagus, either by seed or crowns; both the seed and crowns can be secured from seedmen. To grow plants from seed, sow seed early in the spring in drills two inches deep and twelve inches apart; one ounce of seed will make about 500 plants. When plants are one year old transplant in rows five feet apart and eighteen inches apart in the rows.

TO MAKE THE PERMANENT BED.

Cover the soil four to five inches deep with well rotted manure and disc well, then plow as deep as possible, and fine with the harrow. Then with the plow turn furrows five feet apart, about six inches deep. Place the plants in these about eighteen inches apart, one in a place and with the roots well spread out. Then turn a light furrow back over them and level with the harrow by cross-harrowing. If the soil is dry and you have water,



ASPARAGUS

after you cover them run the water through the furrows before leveling. Give the surface a good dressing with manure each year. Cultivate often.

When crowns or roots are used, plant as above in permanent bed in the fall months or any time through the winter. The advantage of using crowns is you will get some asparagus next spring. It is advisable, however, to let the shoots grow one season before cutting any. This will give larger yields in following years.

FERTILIZERS.

Well rotted barnyard manures are by far the best fertilizers for asparagus. When commercial fertilizers must be used we would recommend fertilizers very rich in nitrogen and potash, to encourage strong and rapid growth. The common practice is to use large quantities of well rotted farmyard manure, preferably applied in the autumn as a top dressing. The heavy application of salt is of little practical value and is gradually being abandoned. Use per acre from 800 to 1,200 pounds of a fertilizer containing: nitrogen, 5 per cent; actual potash, 9 per cent; available phosphoric acid, 7 per cent.

HARVESTING.

At the first signs of early spring watch your asparagus bed closely. When in places the surface shows slightly broken elevations take a long sharp knife, insert eight inches deep and cut the shoot, even before it shows out of the ground. There is a special asparagus knife or chisel sold by seedmen for that purpose. If the shoots are cut before showing they will be more tender, of white color tipped with a pink tinge, which adds much to the attractiveness and beauty of the asparagus shoots.

PACKING AND SHIPPING.

When asparagus has been cut, take it to the packing table and tie twelve shoots in a bunch if of good size; if not, place eighteen or even twenty-four shoots in the bunches. Asparagus should be packed in bushel boxes, marking on the outside of the box the number of bunches contained in the package.

In the early spring, even before the crop of asparagus is ready, growers should write to dealers in produce and commission merchants and state the amount of asparagus they will have for market. It is not unusual that the entire crop can be contracted for at pound rates, as dealers in all markets are always anxious to obtain early asparagus. Asparagus is a desirable money crop for both merchant and shipper.

HOW TO GROW, PACK AND SHIP STRING BEANS FOR PROFIT.

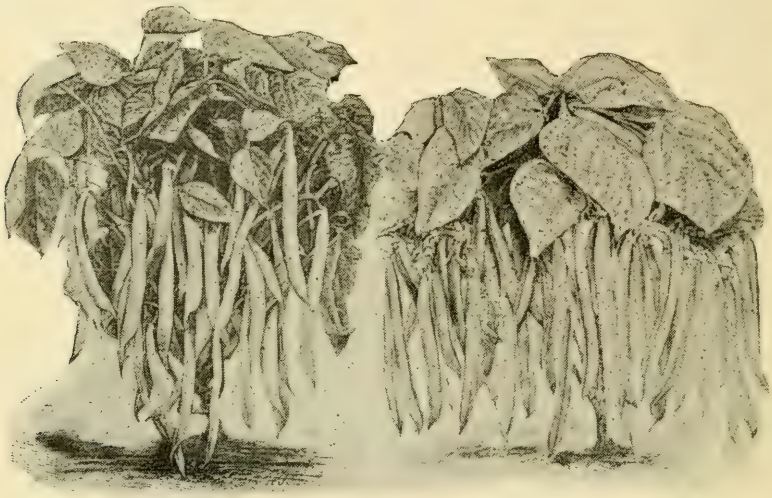
String beans have never been grown in sufficient quantities in the South for Northern demand, when properly packed and shipped upon reliable information. The demand in the early spring is practically unlimited, as beans are universally liked by rich or poor on account of their rich flavor and succulent qualities. Beans can be shipped with profit in carload lots to large markets and must be shipped by express to smaller markets.

SOIL.

Like most all vegetables, beans prefer a light, loamy and partially sandy soil. The land must be well drained and deeply plowed, and thoroughly harrowed before planting.

SEED.

From all accounts from all markets, the most popular, most productive and the most showy bean is the Wardwell kidney wax bean, both flat and



BEANS—(BUSH)

round podded; it is as far ahead of any other bean as the Elberta peach is ahead of all other peaches. There are other useful wax beans, such as the Golden Wax, Black Wax and Valentine, but the Wardwell stands at the head. The seeds come rather high in cost, but the outlay is justified by the results. Round green potted beans are great favorites with some, but the flat green beans are almost unsalable at any time and positively unsalable when in competition with the wax varieties. We advise against planting flat green beans for profit in the future. We have had enough of them. It is true, the Mohawk, being very hardy and early green beans, find ready sale at first, but it don't last long enough to insure profit. It is more advisable to grow a bean that will sell throughout the season, and we recommend only the wax varieties and green round podded to our shippers. It is just as well to drop undesirable vegetables, as it costs as much to grow a poor vegetable as a desirable one. It pays better to conform with the demand of the markets and grow only the best in demand.

FERTILIZERS.

We have a weakness for home-made stable manure, because we know from experience it is the best of all manures, speaking from cost, value and every other standpoint, and we recommend it on all occasions. The truck grower that depends altogether on commercial fertilizers is like the farmer with scores of cows who uses condensed milk in cans for his coffee. Commercial fertilizers are valuable assistants, but should not be depended on altogether as your lands need humus just as your stable manure provides. When planting beans use stable manure well rotted if possible; if not available use commercial fertilizer containing no less than

Nitrogen	3 per cent.
Potash	9 per cent.
Soluble phosphoric acid	6 per cent.

PLANTING.

As we stated before, land must be well pulverized and prepared to plant beans. To attempt to grow beans on cloddy land is seed thrown away. Plant beans three feet apart in the row and drop beans to average a bean every six inches or less. It takes about two-thirds of a bushel to plant one acre. Beans should be planted as soon as the ground warms up in the spring and not before; to plant beans in cold, wet ground means loss, as the *seed will rot.* Cover lightly about two inches.

CULTIVATION.

Beans, like other truck, love frequent cultivation with horse cultivator and hoe. Hoeing should only be done when beans are dry, after rains or dews have dried off.

HARVESTING.

As soon as beans attain full size and the seed about one-half matured in the pod, they should be picked; if picked before they will shrivel up and become unsalable; if too old, too tough for use. Picking should be done every other day.

PACKING.

Beans, as a rule, carry best in small packages like the one-half bushel basket or one-third bushel boxes; if packed in larger crates they are apt to heat and spoil. We have always used the one-third bushel boxes.

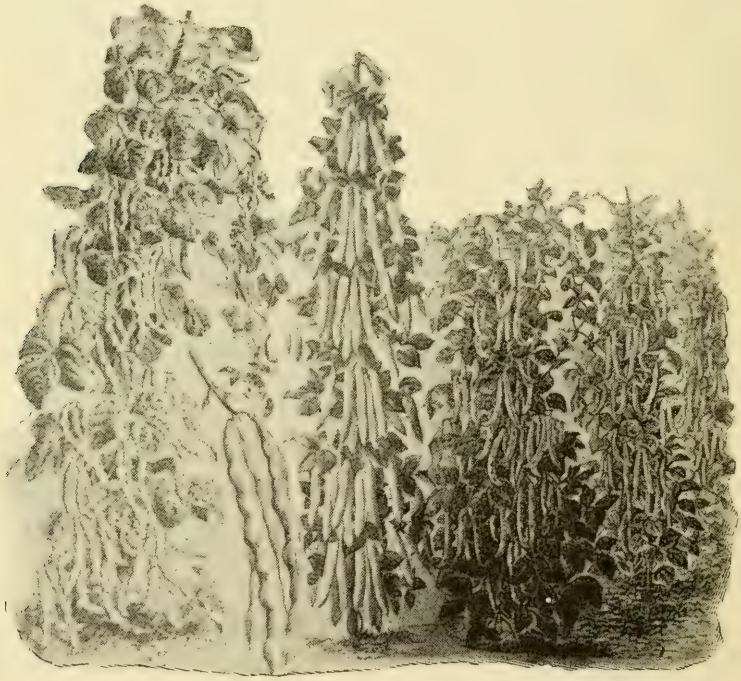
SHIPPING.

Beans can be shipped in carlots, well iced, to all large markets, and by express to small markets in one-third, one-half bushel or hampers without

ice. In barrels beans must be iced with cracked ice, as they are liable to heat and spoil. In carlots beans must be shipped in refrigerator cars, well iced and re-iced in transit. When your beans are ready for market, write to the dealers in the various markets for advice. Study distances and rates and ship only when conditions are favorable in certain markets. There is a heavy demand for string beans in every market in the early spring, and good money can be made on beans, when our directions are followed. We consider beans one of the most profitable of vegetables, realizing often $300 per acre in a short time.

POLE BEANS.

Pole beans are grown by a good many Southern truckers as a very profitable crop, but they are not grown as extensive as they ought to be; the labor of providing brush or poles for the beans to run on deters many from



BEANS—(POLE)

growing pole beans. As a rule in midsummer when other string beans in the Southern markets are scarce, pole beans are in eager demand at good prices. Pole beans can stand more heat and drouth than bush beans and

mature, green, crisp and tender pods when bush beans are burned out, wilted and stale; besides pole beans are more prolific and last longer than bush beans, as they continue to bloom and set on young beans while the older beans are being picked.

SOIL.

Pole beans are not very choice about the right kind of soil; good pole beans can be grown on rocky, stony or gravely land, either clay or sandy land suits them; long roots and a vigorous constitution enables pole beans to succeed on soils and conditions when other beans would fail; they are rank feeders and appreciate liberal application of manure, containing a fair proportion of potash and nitrogen, either placed in the hills or broadcast.

SEED.

There are many varieties of pole beans, either round or flat, wax or green. The Southern prolific a flat green bean, the white creaseback a round silvery green bean. The best of wax pole beans for Southern planting is Golden Wax Flageolet, a handsome, stringless half-round bean. The seed should not be covered over one inch deep when planted and the earth drawn around the hills after planting.

CULTIVATION.

After the ground is well prepared but little cultivation is required; grass should be kept down while the plants are young; after the beans once run they will take care of themselves, as they shade the ground sufficiently to keep down grass and weeds.

HARVESTING.

Pole beans should be picked every other day and while the pods are young and tender.

PACKING.

Pole beans can be packed in one-half bushel baskets, one bushel boxes or hampers, either by express or carlots; in carlots the cars must be well iced.

MARKETS.

All Southern cities, towns and villages offer good markets for pole beans in midsummer, as green stuff of any kind is quite scarce about that time; it would not be advisable to undertake to ship pole beans to Northern markets unless on orders, as usually those markets are supplied with home-grown.

STAKING.

Staking the beans can be done with poles or brush; garden fences may also be utilized as trellises.

HOW TO GROW, PACK AND SHIP BEETS.

Beets are an extremely favorite vegetable with many consumers, on account of their nutritious qualities, fine flavor and pleasing taste. In the Northern States many barrels of beets are stored for winter use. As this, however, does not improve their eating qualities, our fresh beets being much more desirable, hundreds of cars and thousands of barrels are shipped each winter from the Southern States to Northern markets, finding a great demand and remunerative prices. As a matter of fact not enough are grown and shipped to supply the demand. The beets are easily grown and very productive, from $200 to $400 per acre having often been

BEETS

realized from a single acre by Southern truck growers, and we would advise all of our readers to plant beets every fall and winter. Truck growers are so carried away by glowing accounts of profits on onions, tomatoes and potatoes that they often overlook a profitable vegetable like beets. This is not right, and truck growers should plant everything that is in demand for shipping. They can then discard any which prove unprofitable to their soil or locality. It is only by experimenting and catering to the demands of markets that we can achieve success. Beets will prove an important part

of mixed cars of vegetables, and should be grown for that purpose. All cities and towns in the North offer good markets for mixed cars of vegetables, containing beets with other products.

SOIL.

The soil for beets should be rich, loose and deeply plowed, as beets are rank feeders. Manures of most any description can be applied in large quantities to great advantage, stable manures being preferable.

PLANTING.

After plowing deeply, harrow several times to settle the ground and provide a fine seed bed. Sow in rows from 14 to 20 inches apart, cover the seed about one and a half inches deep. It takes eight pounds of seed to the acre. If a roller is run over the beds after planting, the seed will come up quicker and more regularly. It pays to roll. After the plants have five or six leaves, thin out, leaving a beet every six inches. You can also transplant beets, but this is not generally known or done. Cultivate between the rows. The best results have been obtained by cultivating once a week.

SEEDS.

There are several kinds of beets, all having good and bad points. The very best all round beet is the dark Egyptian round turnip beet for shipping purposes. The prices of seed range from 25 to 50 cents per pound.

HARVESTING AND PACKING.

As soon as the beets attain the size of a silver dollar, they are marketable. Pull and cut off part of the long roots and tie in bunches of six beets to the bunch. If larger, say double the size, place three in the bunches. Beets are quoted from 25 to 75 cents per dozen bunches. It is not advisable to allow the beets to grow too large, as they become unsalable. We often read about some truck grower having grown beets to weigh 12 or 15 pounds. Such beets are unsalable. The trade does not want large vegetables, either of beets, cabbage, potatoes or onions. Large specimens are fine to look at or for exhibition, but are not wanted by the trade in any market. Medium size vegetables always sell the best. Like radishes, beets can be packed in crates or barrels, well ventilated. When beets are shipped by express, they should be packed in barrels with cracked ice, a layer of ice, then a layer of beets, using from 10 to 30 pounds of ice per barrel, otherwise they will heat and spoil.

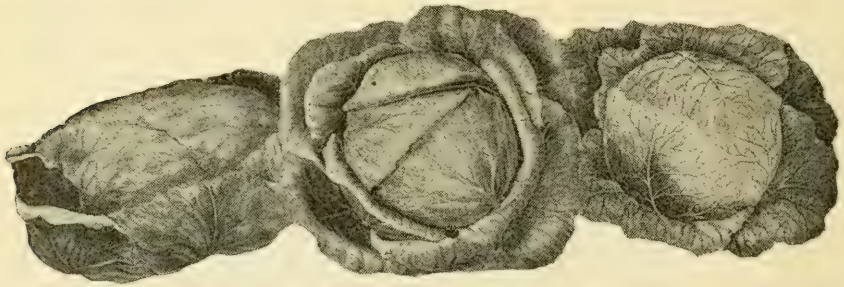
For the market in the fall and winter beets are always shipped with the tops on.

CABBAGE AS A FALL AND WINTER CROP.

HOW TO GROW AND MARKET CABBAGE.

It is hardly necessary for us to say anything in regard to profits on growing cabbage; it is a well established fact that cabbage is a staple crop, at most times in excellent demand and profits from $150 to $250 per acre have often been realized.

The demand for cabbage in the Northern, Eastern and Western markets is constantly increasing with each year; hundreds and even thousands of cars of cabbage are annually disposed off in those markets at higher prices, as a rule, than the Northern grower gets for his cabbage even after storing it for some time. The Southern cabbage arrives crisp and fresh from the



CABBAGE

Southern fields and is preferred by most consumers to old cabbage, the same as new potatoes outrank the old stock. Very seldom the price of cabbage at Southern loading stations falls below one cent a pound or $20 per ton, where often the Northern grower is satisfied with even $6 per ton during harvest time. It will be seen by the above that cabbage is an important and profitable crop to grow.

The growing of cabbage is not difficult and by following our simple directions no one need be in fear of failure, unless natural unfavorable conditions should prevail. On strong land, well manured, an abundant crop may reasonably be expected.

CABBAGE FOR FALL PLANTING.

In the South cabbage seed for a fall crop or early winter is usually sown in July and August. Make the bed reasonably rich with well rotted stable manure or commercial fertilizers and sow the seed in drills or broadcast; cover very lightly and soak the beds well after planting the seed. Beds close to water are advisable; the young plant will decidedly do better if the beds are shaded from the hot midday sun; the plant

should be watered every evening and a very close watch should be kept for insects. Upon the slightest indication of insects the plants must be dusted with slug shot or tobacco dust, sprayed with the Bordeaux mixture or kerosene emulsion. How to dust, spray or make these emulsions is fully described in Part IV of this book.

SOIL.

Cabbage loves best a loose mellow soil, where some humus is in evidence; deep plowing, even subsoiling the land is of great benefit and increases the crop.

SEEDS.

There are many varieties of cabbage seeds offered for sale by the seed dealers, each one claiming some superiority for this particular strain, not possessed by others, and it is true that strains of cabbage, like Henderson, Succession, Surehead, All Summer, Autumn King, Danish, Baldhead and others are very valuable varieties. The oldest standards, of which these varieties are simply strains, are the Late Flat Dutch, Late Drumhead, Early Flat Dutch and Early Drumhead. The main point is to avoid cheap seeds and depend only on the seeds furnished by reliable seed houses, as cabbage from unpedigreed seeds are apt to go to seed before heading, and an entire crop may be lost by inferior seed. If cabbage seed is reasonably fresh and fertile, three-quarters of a pound will produce 10,000 plants, or sufficient plants to plant one acre.

TRANSPLANTING.

The transplanting should be done carefully and if possible during a rainy spell of weather. If the ground is dry, in the absence of any rain, every plant must be *watered immediately* after planting and the soil loosened around the plant *the next day.* Unless the weather is cloudy or rainy, in the late evening is the best time to transplant cabbage. Set the plants 20 inches apart in the rows and the rows 2½ feet apart.

CULTIVATION.

Like all other vegetables, cabbage loves intense cultivation, frequent plowing. Harrowing with horse cultivator, followed by hoeing is essential to success. Never allow your cabbage field to become hard. Soft ground means hard heads; hard ground, soft heads or no heads at all.

FERTILIZERS.

As far as fertilizing is concerned, we have never yet discovered the limit to which manuring may be profitably carried with this crop. It

may be said, figuratively speaking, that cabbage would thrive in a well rotted manure pile. We would recommend a heavy dressing of stable manure, or at least 1,500 pounds of commercial fertilizer per acre. Do not undertake to grow cabbage on land without fertilizers as failure must always be the rule.

MARKETING CABBAGE.

When cabbage shows signs of hardness it should be gone over and cut for market. A light hatchet or a heavy butcher knife are the best tools. A limited amount of cabbage may be shipped to small markets by express in sacks (we prefer the crates), but the bulk of the cabbage crop must always be shipped in car lots for profit. As a rule cabbage is shipped in refrigerator cars, well iced, as it is very apt to heat. Pack only in standard crates 20x20x28 inches.

Shipped by express, cabbage may be shipped without ice in barrels, hampers or crates. It never pays to ship cabbage to any great distance by express, as charges are usually too high.

CABBAGE AS AN EARLY SPRING CROP.

The cultivation and planting of early cabbage does not differ materially from the cultivation of the late fall crop, only there is no special hurry for a fall crop, and the profits of an early spring crop depend more on the speed with which the crop is produced and placed as early as possible on the market.

For this reason experienced gardeners use early quick-maturing varieties, such as Charleston, Wakefield, Early Flat Dutch, Early Drumhead and Winningstadt. These varieties are not as large as the late kinds and slow growing varieties, but most tender and of fine flavor.

For soils, fertilizers and harvesting read our article on cabbage in the preceding article, as the mode of procedure to grow spring cabbage is about the same as fall and winter cabbage. The main point is to secure strong and vigorous plants for early spring planting, when danger of heavy freezes are over; light frosts do not injure young cabbage plants in the field.

To obtain cabbage plants the market gardener makes what is termed a cold frame in which he sows his cabbage seed during December, January and February and which can be covered up by boards, cloth or glass during the coldest nights. No artificial heat is required except further north; in fact, cabbage will do better in a lower temperature than in a high one, as a rule.

HOW TO MAKE AND OPERATE A COLD FRAME FOR CABBAGE PLANTS.

Select any piece of ground well drained and handy to water, and, if possible, sheltered from the cold north wind by a house, barn, fence or hedge. Plow or spade the ground. Now get some boards 1x12; set up on edge east and west parallel 4 or 5 feet apart. Set the north board on top of the ground; lower the south board four inches in the ground; this gives you a slope to the south. Get some short boards to close the ends; bank up the soil or manure on the outside all around. Nail some slats across the top every four feet to hold the frame firm. Now get some good, rich soil from your barnyard, not too strong, and sift this into your frame, so as to raise the side four inches above the outside soil. This insures drainage after heavy rains. Rake and pulverize well. Now sow your seed across the bed in drills six inches apart, covering lightly; keep well watered, but not too much. The advantage you have by sowing in drills, it makes stockier and better plants and you can always count your plants by counting the rows and plants in one row. Do not cover the frame at all unless severe freezes are predicted. Watch the weather report; if reported that the temperature may fall ten degrees below freezing, which means 22 above zero, cover up; keep covered until danger is past. *Never uncover in bright sunlight.* Cabbage in the field and beds can stand 20 above zero; any below this temperature will invariably kill it. For cover you can use glass sash, domestic, old sacks, doubled and sewed together, or boards across the top, covered with manure or hay; be careful not to leave any opening for the cold wind.

Two-thirds of a pound of seed will make sufficient plants for one acre. When you sow seeds you can determine how long you may need your frames or how many, to give you sufficient plants for your requirements. Thirty-two rows across the beds or a cold frame 16 feet long and 5 feet across should furnish plants for one acre or even more.

The earliness of the crop will depend on the condition of the weather and the care that is bestowed on the plants in the frame and in the field after the plants are set out; remember plenty manure and plenty cultivation are the watchwords for an early cabbage crop.

HOW TO GROW, PACK AND SHIP CARROTS.

Carrots are easily grown, similar to beets or radishes, and are a profitable crop for shipping to the Northern, Eastern and Western markets during the winter months.

SOIL.

Carrots succeed best in a rich sandy loam where the soil is sufficiently loose, that the roots may go deep and develop straight and tender carrots.

SEEDS.

The half-long varieties, as the Danvers, Intermediate, Half-long Luc Carrot, St. Valerie Carrot, are favorable kinds for market gardeners. The seed should be sown in drills 18 inches apart in the rows, covered very lightly, and a roller passed over the seed after planting.

FERTILIZER.

To grow carrots quickly, tender and palatable some manure or commercial fertilizers should be used. Land that was manured by stable manure

CARROTS

the previous year is the best, as carrots, like Irish potatoes, do not take kindly to fresh stable manure; it has the tendency to make the carrots scabby; either prepared commercial fertilizers or cotton seed meal, at the rate of 800 pounds to the acre, makes an acceptable manure for carrots.

CULTIVATION.

Cultivation should be done with the hoe and hand-cultivators between the rows. Like all other vegetables, carrots appreciate liberal and often cultivation.

HARVESTING.

After the carrots have attained the size of a finger or a little larger, they should be pulled up and tied in bunches, each bunch containing a dozen carrots and shipped in bushel crates, hampers or barrels by express;

if shipped in barrels, carrots must be well iced with cracked ice in layers. The demand for carrots is limited and we do not advise to grow or ship them in any large quantities, yet as a small crop they have proven very profitable.

CASSAVA.

Cassava is a most valuable crop as a Southern forage crop and food for man and stock. Five tons of cassava roots may be grown on an acre of land that would not produce 20 bushels of corn. Cassava, when dried, will give 700 pounds to the ton; 5 tons will produce 3,500 pounds dried cassava gathered from one acre. In its dry state cassava will keep for

CASSAVA

years; in the green state it is fed to cattle, hogs and poultry. Tapioca is made from cassava; therefore it is also used for human food in the shape of pudding, tasting similar to the sweet potato pudding. Fed to cows, it increases the milk and butter, and hogs may be fattened as quickly and much cheaper on cassava as on corn. Roots have been produced six feet long and six inches in diameter, weighing 25 pounds.

SOILS.

Cassava may be planted on the poorest sandy land and no fertilizers are required.

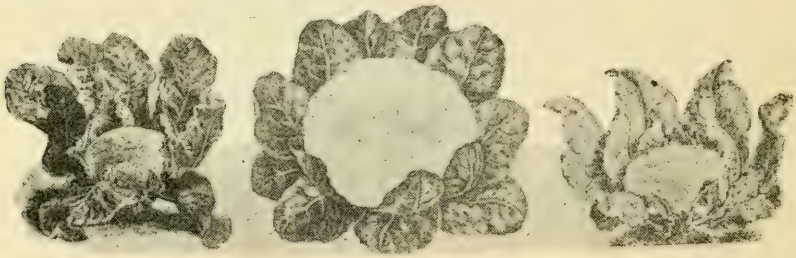
PLANTING.

The stalks are planted like sugar cane in 4-inch lengths and the roots are used for feed. It should be planted in February or March and har-

vested in August and September or late fall by simply plowing the roots out. Every farmer should plant a patch; it beats peanuts, chufas or any root crop. Cassava will yield 600 pounds of pure starch to the ton, superior to corn starch, and sell at double the price. There are large factories in Florida where starch is prepared from cassava.

THE GROWING OF CAULIFLOWER FOR PROFIT IN THE SOUTH.

It is only of late years that the Southern gardeners have paid much, if any, attention to the growing of cauliflower. Aside from its commercial value as a profitable vegetable for shipping purpose to Northern markets, it should be grown by all farmers, if only for their own use, for it is doubtful if there is a single vegetable that is more healthful, nutritious, and as well liked by all as cauliflower, when properly grown and prepared for table use. Owing to the high price of the seeds and general supposition that cauliflower is difficult to raise, very little of it is grown in the South in comparison to other vegetables. These, however, are mistaken ideas. It is true the seed often costs as high as $40 per pound, but the



CAULIFLOWER

seeds are small and even an ounce costing $3 will produce from 1500 to 2000 plants, and the profit from one ounce is frequently $200, so anyone can see the cost of the seed is of small consideration. Then, again, cauliflower is as easily grown as cabbage, and we will proceed to give such directions as will enable anyone to grow cauliflower successfully.

The culture of cauliflower is similar to cabbage, but should be more thorough and ground made very rich. It delights in a rich, moist soil, and in dry seasons should be abundantly watered, especially when heading.

SEEDS.

There are several kinds of cauliflower, and the seeds of Early Danish Snowball, Henderson's Early Snowball, and the Extra Early Dwarf Er-

furt are as good as any for beginners. Be very careful from whom you buy the seeds. Patronize only reputable seed houses.

SEEDBEDS.

The Southern gardeners can sow the seeds about July and August in beds and continue to sow in succession until October. Make a well prepared and manured bed, sow the seeds in the usual way and protect the bed with partial shade during midday, as the most difficult part of raising cauliflower is in growing plants; constant attention must be paid to the beds. It must be kept well watered and guarded against insects. There is a certain moth that flies at night and deposits an egg in the crown of the young plants, thereby ruining the same, as the young grub will eat out the heart. This can be avoided by driving stakes one foot high or more all around the edges of the bed and covering the entire bed and sides with mosquito bar. We would recommend this to all growers, as it affords a complete protection against insects.

PLANTING.

The ground for cauliflower must be well prepared by deep plowing and thorough harrowing, and it *can not be made too rich.* A liberal application of well rotted manure is probably the best; when commercial fertilizers must be used, we recommend no less than one thousand pounds of cotton seed meal, or any other high grade fertilizer, per acre, broadcast in the rows or hills. When the plants are of good size transplant with care and set them 18 inches apart in the rows, and make the rows 2½ feet apart. The young plants must be frequently watered until firmly established. The horse cultivators and hoes must be kept agoing. This stimulates growth and serves to retain the moisture. When heading some gardeners tie the outside leaves loosely over the head to protect it from the sun, which we also advise. When ready for market cut the heads, leaving a few of the leaves on each head. Pack in barrels and crates carefully. State on outside how many are in each barrel or crate.

HOW TO GROW, PACK AND SHIP CELERY.

There is scarcely a vegetable that meets with a more ready reception by all epicures than celery. Its sedative properties, pleasant taste, aromatic flavor, make it a necessity to the meal of the poor as well as the rich. No dinner table is complete without the golden stalks of celery presiding over other good things to eat; its the bouquet and the finishing touch of all feasts.

As celery can be grown in the South nearly every month of the year by following some simple directions, it is strange that thousands of crates of celery should be imported to the South every season from Colorado, Michigan and other States. Southern truck growers should begin to be-

CELERY

stow considerable attention on the growing of celery, as it is a money crop and always in good demand in every large and small market at fair and remunerative prices.

SOILS AND FERTILIZERS.

Celery succeeds best on low, black, rather heavy soil, yet the ground must be subject to thorough drainage. Fertilizer containing a fair proportion of nitrogen, actual potash and phosphoric acid is required; well rotted barnyard manure is therefore the best. Some truck growers apply cotton seed meal after planting, with good results. As far as fertilizers are concerned the nature of ground must be taken into consideration and some experience will be the best teacher.

SEED.

The Golden Self-Bleaching Celery seems to be the favorite variety with most all the truckers, yet there are other valuable varieties, such as Giant Pachal, White Plume, Perfection, Heartwell and the Large White Solid.

HOW TO GROW PLANTS.

Prepare the seed bed by deep spading or plowing, well manured—if procurable, use chicken droppings and ashes, not too strong. Have the soil well stirred and in first-class tilth. Sow your seed broadcast or in drills six inches apart; cover lightly and keep the surface moist until plants show, then water at regular intervals. In the summer months the young plants must be partly shaded from the midday sun. During the winter months the plant beds must be boarded all around so they can be covered up during severe cold weather. Celery is not injured by frosts, but severe freezes, say 14 degrees below freezing point, would kill it in the beds or field if unprotected.

There is a contention among gardeners whether celery should be transplanted on a level or in trenches. Some claim one way the best and some the other. We have come to the conclusion that when the ground is low it is best to plant strictly on a level; if the ground is moderately elevated in trenches. Plant the rows three feet apart, the plants just six inches apart in the rows; if possible transplant only in the evening; water freely; next morning loosen the ground around the plants with a hoe or rake; repeat this daily until plants are firmly established. Keep well cultivated for six weeks to stimulate growth. Now the first handling begins; this should never be done when the celery is wet from either rain or dew. Handling consists in taking the plants in the left hand and drawing the soil around the plants to make the plants grow upright and keep them in that position; bleaching then commences, (some gardeners tie the bunches with string or grass). One or two weeks later, when the plants have grown taller, plow out the middle towards the celery, *but not on the celery;* now again take the plants in your left hand, pack the dirt firmly around, being very careful not to get any dirt between the leaves or in the crown of the plants; after this, take a hoe and draw the soil evenly to the plants from each side, always leaving a small portion of the tops exposed; run your sweep through the middle and sweep out middle perfectly clean. Your cultivation of celery is now done, and your celery should begin bleaching to a rich golden white.

HARVESTING AND PACKING.

Take a spade and commence at the end of row and dig out the celery; do not allow it to lay in the sun for any length of time. Remove to the packing shed. Now trim off roots with a sharp knife leaving the butt end to a point; remove all irregular distorted outside leaves. Some gardeners wash the celery. We do not believe in washing any vegetable be-

fore shipping, as it causes rot to appear much sooner than if left unwashed. If you follow our directions your celery will be nice and clean without washing. Now tie evenly one dozen plants or stalks into a solid bunch, using strong twine for the purpose; pack in crates, baskets or barrels; if shipped by express cracked ice must be used in the barrels; by freight celery must be shipped in well iced refrigerator cars. Celery sells from 40 cents to $1.50 per dozen bunches in about all markets and it is a highly profitable crop, which yields often several hundred dollars per acre. By following the above plain directions anyone, even the beginner, can grow successfully celery for profit.

HOW TO GROW, PACK AND SHIP CUCUMBERS FOR PROFIT.

Quite a portion of the human family have but little use for cucumbers; this fact, however, seems to intensify the craving and preference of the other portion of the human family for this unpopular and popular vegetable. Lovers of cucumbers will pay more for this particular product than any other, especially if they are inclined to be scarce.

It is not uncommon to see cucumbers quoted as high as three dollars

CUCUMBERS

per dozen or twenty-five cents apiece throughout the winter months. In winter a few shipments arrive in the Northern markets from the extreme southern part of Florida, and of late Old Mexico furnishes some, as cucumbers have no use whatever for Jack Frost and will only mature below the frost line. The largest part offered in the Northern markets are obtained from hotbeds and hothouses.

Surrounding large cities in the East and Middle States are thousands of skilled gardeners who almost make a specialty of growing cucumbers

under glass with artificial heat, and no small amount of money represents this industry in the United States. The city of Boston leads, with Cincinnati a close second, in furnishing cucumbers for winter market.

As soon as the weather gets warm the cucumbers, being confined in frames and needing air, refuse to produce fruit. Then is the time when the Southern cucumbers begin to arrive, to find a friendly and eager market, for in the spring and early summer the demand for cucumbers is enormous. It all depends on the supply. Prices will climb sky high if the market is short.

The demand for cucumbers is limited all through the months of January, February, March and April, but in May, should the weather assume summer proportions, the demand grows immense and hardly any market can get enough of them. It is indeed fortunate for Southern growers that they are in a position to furnish the cukes in May and June in unlimited quantities; in fact, our season is then at its height, and cars of cucumbers are in demand in all large cities, and express shipments in small cities throughout the country.

Under our own observation we have seen a car of cukes of over five hundred bushels unloaded the first part of June in Chicago, delivered on South Water street at 7 a. m., and at 8 a. m. not a cuke was left, and at the time we were informed that several cars could have been disposed of easily the same day.

Cucumbers are very easily raised; there is hardly a vegetable that will stand neglect and abuse as much as cucumbers; at the same time there is no plant that will appreciate and respond quicker to diligent, thorough and frequent cultivation.

Cucumbers love a loose, sandy loam, well fertilized, either with well rotted stable manure or cotton seed meal. Where cotton seed meal is used apply one thousand pounds to the acre broadcast; when used in hills it must be well mixed with the soil, as it has a tendency to burn out the young plants where this is not done. The seed can be planted in drills about six feet apart or hills about five feet apart each way. Two pounds of seed will plant an acre.

Cucumbers may also be planted in drills and cultivated in the shape of a ridge; this has been our favorite method with good results.

As soon as plants show third and fourth leaves the hoe and cultivator should be applied at least once a week until the vines begin to run, when no further cultivation is necessary. The vines should never be disturbed. In gathering the crop great care should be exercised in not stepping on

the vines. The fruit should be pinched off with thumb and forefinger; never pulled off, as the pulling disturbs the vine.

The best size is from six to eight inches in length; the small round cucumbers, called culls, should be pulled off the vines and thrown away, as they are not fit to be shipped. All cucumbers shipped must be green; never ship a yellow cucumber or any that show the least yellow.

The question of seed is a mere matter of taste. Some prefer the Long Green and some the White Spine. We have found the Long Green, on account of its length, undesirable, because it does not pack well. We have little use for the White Spine, because it has a tendency to be too white; the market wants a medium dark green cucumber, and we use a hybrid between the Long Green and White Spine called Talby's Hybrid cucumber or New Orleans Market, the Klondike or Davis, the seed of which can be obtained from any reliable seed house.

In the early part of the season it is advisable to ship in one-third bushel boxes, containing about three dozen; later on, when cucumbers become more plentiful, one bushel boxes should be used, especially if they are intended for car lots.

The cultivation of cucumbers should be encouraged all over the South. There is no apparent reason why one dollar should be sent out of the State for pickles. Every truck growing community should have in connection with shipping a canning plant on the co-operative plan, using up the surplus when too late to ship to advantage. Cucumbers, beans, tomatoes and various other products could then be utilized in place of going to waste. This outlet would also serve to keep markets from becoming overstocked, as there would be no necessity of crowding stuff into where it is not wanted.

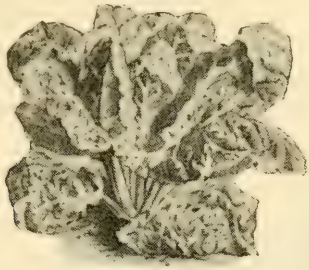
In Part VI of this book, *The Modern Guide,* will be found complete instructions how to pickle cucumbers for commercial use and also how to can and preserve all fruits or vegetables either for home use or for market.

HOW TO GROW, PACK AND SHIP COLLARDS.

Collards are similar to cabbage, with the exception that collards do not form heads, simply growing into loose leaves, which are used like cabbage and spinach as greens during the fall, winter and spring months. Collards, when cooked properly, make very favorite greens with many people, especially in the South; the demand is, however, limited, and it is not a vegetable that we would advise to grow to any large extent for shipping purposes, as mustard, spinach, beet tops and turnip tops are preferred by most people for greens.

PLANTING.

Sow the seeds in drills 2½ feet apart in the rows; hoe and cultivate with horse cultivator, keeping the ground loose and mellow. The ground



COLLARDS

should be enriched by either stable manure or commercial fertilizers, about 800 pounds to the acre.

HARVESTING.

When the leaves are grown and still tender cut the collards and tie in bunches; ship in bushel crates, hampers or barrels. When shipped in barrels by express, cracked ice must be distributed throughout the barrel or else the collards will heat, turn yellow and become unsalable.

SWEET CORN.

HOW TO PLANT, HARVEST AND SHIP.

The cultivation and growing sweet or field corn as roasting ears for table use is strictly an American innovation. The pleasant flavor succulent, starchy substance, with fresh creamery butter added, make the ears of corn a great favorite to native Americans, both North and South, and even to the foreigner who once partakes of the rich and nutritious dish.

The demand in the early spring is practically unlimited, and the Southern grower is enabled by his early advantages to place sweet corn or field corn, as roasting ears, on the tables of the Northern consumers about the time the Northern farmer or truck grower plants his crop of corn in the field.

In large markets carloads of sweet corn could be disposed of at highly remunerative prices, and the cultivation of the corn should be encouraged and practised by Southern growers.

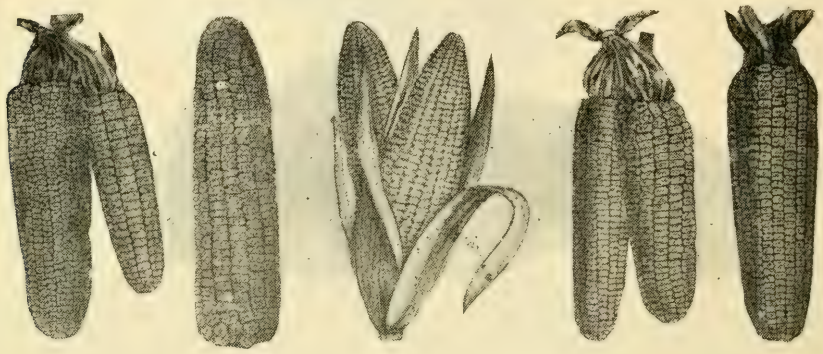
The only difficulty in growing and shipping sweet corn is the boll worm,

which infests the end of the ear. There is no remedy for this except to destroy the moth that deposits the egg in the corn in the spring.

In transit the green corn is very apt to heat, unless it is either shipped in small packages, well ventilated, or shipped on ice.

SOIL.

Like other corn, sweet corn needs either strong land or the land must be well manured; as earliness is one of the requirements, manure must be



SWEET CORN

applied very liberally; either stable manure or commercial fertilizers, at the rate of 1000 pounds to the acre, should be applied, followed by clean cultivation.

PLANTING.

As soon as all danger of frost is over, plant the corn in drills, the rows 2½ feet apart; after the corn is 12 inches high thin out to a stand, leaving a stalk about every 12 inches in the rows.

SEEDS.

While the common field corn makes excellent roasting ears, most gardeners use small special varieties which are sweeter and also much earlier. Adam's Extra Early is a standard favorite variety; so is the Evergreen Sugar corn; the Improved Leaming, Stowell's Sugar and Mexican June corn.

HARVESTING.

In gathering sweet corn one should be very careful not to gather it too green nor too ripe; either stage makes the corn undesirable. The best corn is gathered when it is nearly full grown and still slightly milky; corn of that description is always salable.

SHIPPING.

Corn shipped by express should be in open bushel crates or hampers. If shipped in barrels, the corn must be well iced with cracked ice all the way through, as there is great danger of heating in transit. In carlots sweet corn can be shipped only in refrigerator cars, well iced, and re-iced in transit.

EGG PLANTS.

HOW TO GROW, PACK AND SHIP.

Anyone familiar with growing tomatoes would find no difficulty in producing egg plants for market, as the planting and cultivation are about the same. During the past decade the demand for egg plants has been

EGG PLANT

steadily increasing, until the shipping of egg plants from the South, especially from Florida, to Northern markets has become a remunerative industry. It is therefore advisable for Southern truck growers to grow egg plants for market. By planting a variety of truck, the grower has something to ship every day during the shipping season, and he also finds which pay the best for future operations.

SOILS.

Medium sandy soil, enriched by liberal manuring, give the best results for egg plants. The soil should be deeply plowed and placed in as good condition as possible. Egg plants planted in rich loose ground grow fast and produce fine specimens.

SEEDS.

The large purple or New Orleans Market, or the New York Market are

both showy and very disirable varieties. Two ounces of seed will produce 1000 plants; 12 ounces of seed is sufficient to plant one acre.

SOWING AND PLANTING.

The seed should be sown in hotbeds in December and January. (See Hotbeds, How to Make, in Part IV of this book.) When a couple of inches high they should be transplanted into another frame, so that the plants may become stronger and robust. When warm enough, generally during March, the plants can be planted in the open ground, about two and a half feet apart. In the extreme South, as South Florida or South Texas, egg plants may be set out earlier, but frost would invariably kill egg plants; even low temperature and cold winds injure the young plants; therefore caution must be exercised in the early spring. It is safer to plant late and hasten the crop with liberal manuring and cultivation.

FERTILIZERS.

Egg plants are rank feeders and appreciate well rotted stable manure; land that was manured with stable manure the year previous is apt to make a fine crop. Where stable manure is scarce, commercial fertilizers containing a fair percentage of nitrogen and phosphoric acid is advisable, but must be applied quite heavily, at least at the rate of 1500 pounds to the acre. This can be applied in the hill or broadcast; if applied in the hill the fertilizer must be well mixed with the soil.

SHIPPING.

When egg plants attain their growth and become a dark purple color, they are ready for the market. Pack in bushel crates, hampers or barrels, no ice being required when shipped by express; in carlots egg plants must be iced to preserve a fresh appearance.

KOHLRABI.

Kohlrabi, or turnip cabbage, represents a curious variety of the turnip and cabbage families in which the reserve material of the plant is stored in a tuber-like enlargement of the stem just above the surface of the soil rather than beneath. Although, strictly speaking, it does not belong to the roots and tubers, it is so similar to them that it has been included in this discussion. Kohlrabi is considered best in the early summer, when it is still young and tender, but it is commonly found on the market until late fall. In flavor it is more delicate than either turnips or cabbage.

though it resembles them more nearly in this respect than it does other common vegetables.

Kohlrabi is very popular with the European population of our country and esteemed highly by the Germans.

It is used for soups, or prepared in the same manner as cauliflower. For late fall and winter use it should be sown from the end of July till the middle of October; for spring use, during January and February. When the young plants are one month old transplant them in rows one foot apart, and about the same distance in the rows. They also grow finely if sown broadcast and thinned out when young, so that the plants are not too crowded, or, they may be sown in drills, and cultivated the same as rutabagas.

When kohlrabi is the size of a dollar or larger, it is ready for market; it is more tender when of small size than if left to grow too large. We believe kohlrabi can be made a most profitable crop for the Southern gardener when shipped in the fall and winter season, tied in bunches like turnips. We would advise Southern growers to give this vegetable a fair test. It can be grown about like turnips or rutabagas and it makes a fine feed for milk cows.

The Early White Vienna variety of kohlrabi is the best kind for Southern planting.

GARLIC.

HOW TO GROW, HARVEST AND SHIP GARLIC.

The various members of the onion family are commonly used for flavoring purposes, and garlic may be said to stand at the head with many of

GARLIC

our citizens, especially those of Italian, French, Spanish and Mexican origin. Garlic is salable in most markets in its dry state at very fair profit, from 5 to even 10 cents per pound being paid for the same.

Garlic is easily grown, but like the entire onion family thrives best in loose, rich soil.

PLANTING.

Garlic may be planted in the South from September until March first. Garlic stands cold better than any other garden product, and we have never had a crop killed entirely by cold. Garlic is best planted in rows 15 to 18 inches apart and 6 inches apart in the rows. It can be grown without transplanting after the small bulbs have once been planted.

SETS.

There are two varieties of garlic—the Mexican, or small, and the Italian, or large; the difference in yield and strength, as well as ease of planting is vastly in favor of the Italian. Pods of the Mexican are too small to weigh on the ordinary scales, but we have raised the Italian that a single pod weighed a pound.

The strength of the two varieties are in favor of the Italian, three to one. The Italian is easily seperated into smaller pods, when one desires to plant, and does not lose weight by evaporation like the Mexican. Both varieties are propagated by planting the divided pods, about six inches to a foot apart—the latter distance being preferable, as it makes it easier to work with the hoe.

The Italian has small bulbs at the root of the matured bulb that will reproduce, that the Mexican has not. The Italian forms a seed stem that blasts, and if this seed stem is cut out early, it makes a much larger bulb.

SOIL AND FERTILIZERS.

The soil best adapted to raising garlic is a rich sandy loam, and as garlic—like most vegetables—are not averse to fertilizing, a good amount of well rotted fertilizer mixed in the drill with the natural soil increases the yield with profit.

In the absence of stable manure, commercial fertilizer must be used, containing a fair percentage of nitrogen and potash, at the rate of 1500 pounds to the acre. This fertilizer may be applied broadcast or applied in the drills, well mixed with the soil.

INSECTS.

Garlic is almost insect-proof; except the root maggot on old land, hardly any animal will touch it, and from this point garlic is easily grown, because its own flavor is its protection.

Garlic will also stand drouth well, better than too much moisture; therefore the land upon which the garlic is grown should be well drained

HARVESTING.

When the bulbs have attained their growth, which is indicated by the tops turning yellow and falling down, garlic is ready to pull. It should be gathered in dry weather, braided in strings about 4 feet long and hung up to dry completely in a barn or shed. In shipping, barrels, crates or sacks may be used.

HORSE RADISH.

HOW TO GROW AND SHIP.

Owing to the peculiar flavor of horse radish as an appetizer, this root is very extensively grown in more Northern localities; in the extreme South we made many failures until we planted a bed on the north side of a barn, and the partial shade and rich surrounding seemed to agree with horse radish and we had a fine bed in the fall; in the open field it would invariably succumb to the hot July and August sun.

SOIL AND FERTILIZERS.

Next to a well rotted manure pile, horse radish loves a loose soil, highly manured, and where good rich stable manure can not be obtained, we can not advise the cultivation of the root. Commercial fertilizer will cause

HORSE RADISH

the plants to grow to tops, the roots requiring a humus in the soil, only present when stable manure is used extensively.

PLANTING.

Horse radish is best propagated by small pieces of roots cut 1 or 2 inches long and planted 12 inches in the row and the rows 2 feet apart. After the roots are well established, very little cultivation is required; some weeds to shade the ground is no detriment to the plants.

HARVESTING.

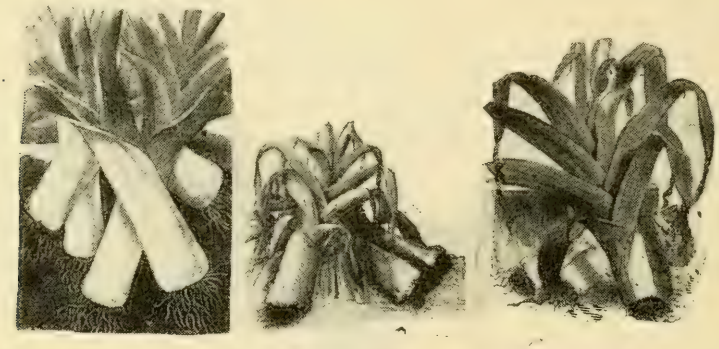
When the roots are about 1 inch in diameter or more, the horse radish

is ready for market. Plow or dig out the roots with a spade; cut in lengths about 18 inches long, tie in bunches, and ship to market in barrels or crates. Wherever horse radish will flourish and produce nice roots, it becomes a highly profitable crop and should be cultivated by truck gardeners.

LEEK.

Leek is also a species of the onion family, highly esteemed for flavoring soups and stews. The demand is limited and it should not be grown in large quantities.

Leek should be sown broadcast and transplanted, when about six to eight inches high, into rows a foot apart, and six inches apart in the rows.



LEEK

Should be planted at least four inches deep. They require to be well cultivated in order to secure large roots. Sow in October for winter and spring use, and January and February for summer.

Large London Flag is the kind most generally grown.

Large Carentan—This is a French variety which grows to a very large size.

Large Rouen—A French variety introduced here some years ago, which does well in our climate and seems to be particularly adapted to our soil. It grows shorter than either London Flag or the Carentan and much stouter than either of them. As a market variety it can not be excelled.

HARVESTING.

Leek should be pulled before the tops show any yellow and still green; tie in bunches and ship like turnips or radishes.

LETTUCE.

HOW TO GROW, PACK AND SHIP.

The cultivation of lettuce truly belongs to diversification and no truck garden is complete unless lettuce is given a prominent place, especially in the Southern gardens. Besides an excellent demand for lettuce in all Southern cities, there is a constant demand for lettuce in all Northern cities and towns throughout the months of November, December, January,

LETTUCE

February and March. Many instances have been reported where $300 have been realized from the sale of lettuce from one acre. About all markets North or South quote lettuce from 25 cents to $1 per dozen heads, markets fluctuating according to supply and demand. The growing of lettuce is very simple, and success is easily obtained by following a few of the minor directions.

SOIL.

The soil for lettuce should be a rich, dark, mellow loam, and if inclined to be slightly sandy it will be better than if too heavy. The ground must be well drained, and if level is better made into narrow beds, so that water from heavy rains will run off quickly.

FERTILIZING.

As neither fruit nor seeds are desired, and crispness and quality depends entirely on the rapidity of its growth, the fertilizer should contain a large proportion of nitrogen and phosphoric acid. Of the commercial fertilizer 1000 pounds should be used per acre under all conditions; well rotted barnyard manure liberally applied is the most desirable fertilizer of all.

PLANTING.

Some gardeners simply broadcast the seed in beds and thin out a reasonable stand; others, and which is the more proper way, sow the seeds in beds and then transplant in rows or on beds, ten inches each way for the

larger kinds, less for the smaller. It is desirable and adds to quicker growth if cultivated frequently with hoe or rake.

SEEDS.

Nearly every truck gardener has favorite varieties. We have, however, by actual experience, found that the Big Boston Market gives the best results for shipping purposes, as it is a fine, showy cabbage lettuce, very hardy and of quick growth. Lettuce should be planted every month until March for shipping purposes, as after March only home market can be depended upon.

PACKING.

When lettuce attains its growth, that is, before it becomes tough and discolored, it should be cut with a sharp knife, some of the outer leaves removed, and then packed with cracked ice in barrels. Always state number of dozen, on the outside of barrels, as this adds to a quicker sale of the lettuce.

As we stated before, lettuce is in good demand in all markets, large or small, and we positively advise every truck grower to try lettuce extensively. The seed is cheap and the culture very inexpensive. By following the above directions every truck grower and beginner can realize good profits on lettuce.

CANTALOUPES.

HOW TO GROW, PACK AND SHIP ROCKYFORD CANTALOUPES.

The growing of cantaloupes, especially of the Netted Gems variety, commonly known as Rockyfords, should receive special attention from Southern truck growers, because cantaloupes when properly grown and

CANTALOUPES

shipped to Northern markets, are a profitable crop, especially early in the season, when Southern growers can place them in those markets. There are some features that must be strictly observed.

First: Absolutely pure seed. Cantaloupes, like all all vine products, are apt to sport when growing close to cucumbers or watermelons. The seed will mix and make the cantaloupes grown from those seed almost worthless, as far as flavor is concerned, as like begets like; therefore, it is very important to get only the best seed. Buy your seed only from reliable houses. Cheap seed is dear as a gift, for your crop will only be a disappointment. Two pounds of seed will amply plant one acre.

SOIL.

The soil for cantaloupes should be a deep, sandy loam, easy to cultivate and absolutely well drained. We would prefer a gentle slope of the land.

FERTILIZERS.

We recommend stable manure with ashes mixed for one; chicken droppings or bat guano as another and phosphate of bones, either of which will make good netted melons, if proper cultivation is bestowed.

PLANTING.

After the ground is warm, well plowed and harrowed, check off the land six feet each way; in each hill apply a shovelful of manure well mixed with the soil, or a double-handful of commercial fertilizer. Now draw a gentle hill and plant about 12 seeds in each hill, allowing four for the insects, four for the blackbird and four to grow. As soon as plants are well developed, keep the hoe and cultivators going; gradually thin out to two plants in the hill. When vines begin to run freely, stop cultivation, except after a heavy rain, break the crust with a rake or light harrow, being very careful not to disturb the vines to any extent. A little grass at this time is no positive injury in the patch.

PICKING AND PACKING.

One of the greatest problems before Southern growers is how to pick, pack and ship Rockyford cantaloupes.

Anybody can pick beans, cucumbers, or other truck. How to pick cantaloupes is a science that takes experience and almost an expert to properly pick cantaloupes at the proper time or day. It might be said, a cantaloupe is one day entirely too green; next day just right and the next day too ripe to ship. It is, therefore, of the utmost importance that cantaloupes should be picked at the right time, because buyers of late years have become very particular. They well know that if picked too green it will be of no flavor, therefore worthless to the trade.

When the melon begins to ripen, pick entirely by color and you will

soon be able to tell a melon as soon as it will ship. If you begin forcing the melons from the vines, it bleeds the vines and the other melons come off premature, and are 'punks' or without flavor. This is a great mistake, and if a melon be picked two days too soon it is never good and others are injured on account of it. The best way to pick is in sacks hung under the shoulder, and the pickers should have enough sacks so that when one is filled it can be laid on the sled which follows the pickers (leave a roadway every twelve rows for the sled), and another sack taken in. The sled is then hauled to the packing shed, which should have a long trough made of burlap about three feet from the ground into which the melons can be emptied from the sacks so that the melons are never bruised and never exposed to the sun after picking. In crating, take hold

CANTALOUPES

of the melon so that the thumb rests on one end, and the second and third fingers on the other, and by a slight pressure you can readily detect any "soft ends," which must be thrown out. Now you look the melon all over for any faults that may appear, and if it is O. K., place it solidly in the crate, taking care not to bruise it, and at the same time to have the crate well filled, so there is not a loose melon in it. Do not put in a green melon, and make it a rule to put in only what you would be willing to buy. Get the crates into the iced car as soon as possible, if to go by freight.

The standard crate is 12x12x24 inches and the standard pack is 45 melons to the crate.

There is nothing gained by cutting back the vines, as the loss both in quality and quantity of yield more than offsets any increased earliness.

In loading cars cantaloupes should always be cooled off before they are placed in an iced car, because if they are put in hot they will immediately sweat. This sweat will not leave the cantaloupes, because, after the doors of the cars are closed, there is no chance for it to leave. This moisture on the cantaloupe will cause it to mould and rot the rind and they will be soft, even if still green. Four hundred crates will load a car, making 20,000 pounds. Favorable markets are St. Louis, Mo.; Chicago, Ill.;

Cleveland, Ohio; Pittsburg, Pa.; Detroit, Mich.; Cincinnati, Ohio, and Buffalo, N. Y., and all large cities in car lots; by express, smaller markets are more profitable.

WATERMELONS.

HOW TO GROW AND LOAD FOR MARKET.

For several reasons the culture of watermelons in the South for the Northern markets is extremely profitable when proper methods are employed. The culture is easy; most any land will suit the melon; the melons require no crates or boxes; therefore they can be both cheaply grown and shipped.

SOIL.

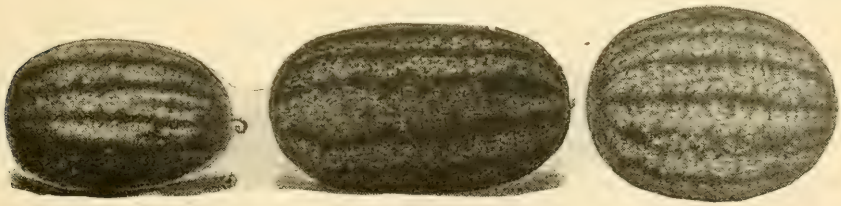
Watermelons, like most vine products, thrive best in a slightly sandy, loose soil. New land, as a rule, is well adapted to melons. The land must be well drained, therefore a field having a slope is preferable.

PROXIMITY TO RAILROADS.

To make watermelon culture profitable the patch should be close to loading stations. The melons being heavy, long hauls are unprofitable, in fact, many of the largest watermelon growers in the South are provided with a spur track right in the field, where the cars may be loaded at leisure and with care.

SEED.

There are many excellent varieties of watermelons, as the Georgia Rattlesnake, Mountain Sweet, Kolb Gem and others, yet of late years the Southern growers have found the Alabama Sweet to be the best all-round melon for shipping. It is of an attractive, oblong shape, dark green in



WATERMELONS

color and of a sweet and fine flavor, but the most important part is it has a hard, tough rind, and therefore possesses fine shipping qualities, which is essential in profitable melon shipments. Crushed and broken melons

in the car cut a considerable figure in the account sales of any car. Many growers for this reason grow the Alabama Sweet to the exclusion of any other.

FERTILIZERS.

While most soils in the South would grow a fair crop of watermelons without any fertilizers, it is equally certain that fertilizers employed in the hills are of great assistance for earliness and a superior quality of melon. There is hardly anything better than a shovelful of well rotted barnyard manure applied under each hill. Care must be exercised that the manure is well mixed in the soil, otherwise there is grave danger of heat, which may burn the roots of the young plants. Where stable manure is not available, commercial fertilizers containing a fair percentage of potash and nitrogen may be applied at the rate of about 400 pounds to the acre, or a large handful to each hill, well mixed with the soil.

CULTIVATION.

As we stated before, the cultivation of watermelons is neither difficult nor expensive. Plow your ground well broadcast, harrow until in fine tilth; now lay off your ground about twelve feet each way with a shovel plow, and at each turning apply your fertilizer. Mix well and raise a slight hill with the hoe, and then proceed to plant your seed, using about nine seeds to each hill, allowing three for the insects, three for the birds and three to grow.

When plants show third or fourth leaf, hoe the hills well and follow with double shovel cultivator and harrow between the rows. Keep the top of the soil loose to retain moisture until the vines begin to run in earnest. Then stop cultivation altogether. It is no disadvantage to allow some grass to grow after the melons are setting. Many old growers say it is better and we quite agree with them.

WHAT IS THE BEST SIZE TO GROW?

From a commercial standpoint, the markets do not take kindly to large, overgrown watermelons and this is true of all other fruits and vegetables. A car of watermelons averaging from 20 to 30 pounds each melon sells to better advantage than a car of 10 or 15 pounds average or a car of 40 to 50 pounds average. Medium size fruits and vegetables is what the market wants and it is of importance to conform with market requirements to insure profits.

A car of watermelons averaging 25 pounds to the melon will hold about 1000 melons and is the best selling car as far as size is concerned.

LOADING.

Watermelons should be loaded in ventilated cars. Clean stock cars are as good as any. Never load in a dirty car. Place about 10 inches of straw, hay or pine straw on the bottom of car. Now place every melon carefully and snugly in its place, commencing at the ends of the car and finishing at the doors. Allow no one to walk over the melons. Load the car about one-half or less full in height. When loading, carefully examine every melon for soft places. Throw out every one that shows any defect. It is better to throw the melon away at loading than to throw it away at the receiving point, after paying freight charges on the melon.

GREEN MELONS.

We find in our travels among the commission merchants that there is a very general complaint that many carlots of watermelons from the South early in the season are cut too green. The shippers are too hasty. A ripe melon is a luxury, a green melon is a disappointment, and melons must be ripe to be healthy and salable, therefore ship only matured melons. Many fruits will ripen in transit. A watermelon once cut from the vine remains as it is.

HOW TO TELL A RIPE MELON.

Most experienced melon pickers can tell a ripe melon from the looks. Others look for the curl near the melon if it is dead. Others squeeze the melon to hear it crack; this test injures the melon for shipping. The best test we have ever found is to sound the melon with a snap of the finger. If the sound is hollow and rings the melon is sure to be green. If the sound is flat and dead the melon is ripe. Snap the top of your shoe. If the melon sounds the same it is sure to be ripe.

PROFITS.

A car of watermelons brings anywhere from $50 to $200 per car, depending on earliness and quality. One acre should produce from one to two cars.

MARKETS.

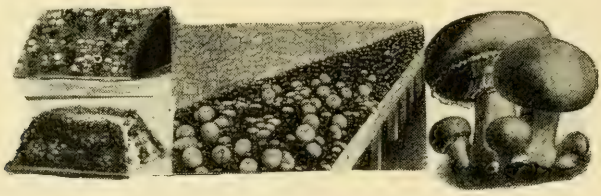
All Northern cities are favorable markets early in the season. The main questions are to load only good melons and get accurate advice about market conditions.

HOW TO GROW MUSHROOMS FOR PROFIT.

Edible wild mushrooms may be found in abundance in pastures and woods throughout the growing season, but especially during the autumn months. Attention has been called to these wild forms by a number of the experiment stations, and many well illustrated bulletins have been published on the subject. Many people are deterred, however, from the use of this desirable edible because of a fear of accidentally gathering the poisonous kind.

The cultivated mushrooms are not grown as yet to any great extent in the United States. They may be had in cities and in limited quantities in some of the larger towns, but are usually scarce and expensive. Many people who would enjoy having mushrooms added to the home menu are debarred because of the difficulty of obtaining them except at considerable expense and because of unfamiliarity as to methods of home culture.

Owing to the increased interest in mushrooms, G. F. Atkinson and R. Shore, of the New York Cornell Station, made a study of methods of mushroom culture on a small scale and have recently reported the results of this work in bulletin form. The main purpose of the work was to find



MUSHROOMS

out by actual trial what success might be expected by the beginner in growing mushrooms where no special houses and no elaborate preparations were made for their culture. Based on this work the following cultural directions are given:

Cellars or basement rooms where the temperature in the winter does not go below 55 degrees or does not rise above 65 degrees are suitable places for growing mushrooms. It is not advisable to make them under the living part of the house, since the odor of the manure will fill the house. They can also be grown in stables which are not too cold in winter. * * * Beds can be prepared on the cellar or basement floor by using the wall for one side of the bed. A board or plank 1 foot to 15 inches in width can then be stood on edge 3 to 4 feet from the basement wall and held in position by the necessary upright scantlings and supported

at intervals to hold the material in position. In this way a box of the desired width and length can be made, the floor of the basement or cellar serving as the bottom. If more space is desired, tiers of beds can be made; that is, 2 or 3 or 4 beds one above the other against the cellar wall. This is a common practice. Crosspieces from the uprights can be nailed on, upon which the floor of the upper beds can be laid. These should be made of lumber at least 1 inch in thickness. A space of about 20 to 24 inches should be left between the top of one bed and the bottom of the one directly above it. All these places should have some ventilation, but there should not be air currents, and care should be taken to make the rooms in which the mushrooms are planted clean and sweet, in order to avoid as far as possible any conditions which would encourage insects and other enemies of mushrooms.

SOIL FOR MUSHROOMS.

The best soil for mushrooms is that made from horse manure from well bedded stables. While some straw is desirable, any large percentage is objectionable and should be removed. The manure is cured by putting it under cover in piles 3 to 4 feet deep and of any length and width. These piles soon begin to ferment and heat.

To prevent its becoming too hot, the manure must be forked over and made into a new pile. This is done by beginning at one end, turning the manure over, shaking it slightly as it is turned into the new pile. It may feel to the hand quite hot, but as long as it does not turn white or get too dry the heating will not harm it. Usually after the manure is well heated, turning once in two or three days will answer, but sometimes it is necessary to turn every day.

If the manure becomes too dry, sufficient water may be sprinkled on to make it moist, but not too wet. It usually requires ten to fifteen days to cure, but should not be put in the beds or boxes until the temperature has gone down to 100 degrees F.

PREPARATION FOR THE BED.

In the preparation of the bed a layer of the coarse, more strawy portion of the manure is first put on the bottom and then thoroughly tramped or pounded down. Succeeding layers are then put on and each packed down until the bed is 10 to 12 or 14 inches thick. For a few days after the bed is made, the temperature is likely to increase, after which it will gradually cool off. A thermometer should be kept in the bed several inches below the surface, and when the temperature falls to 70 or 75 degrees F. the mushroom spawn may be planted. Sometimes one part of

rich soil is used with four or five parts of manure in making the beds. In such cases a little of the soil is added with each layer of manure.

PLANTING THE SPAWN.

Cultivated mushroom spawn, used for planting the beds, may be obtained from nearly any seedman, in the form of dried manure bricks. Before using, it should be broken up into pieces about 2 inches in diameter. These pieces are planted in the bed 8 to 10 inches apart by making a suitable hole about 2 inches deep and pressing the spawn firmly into it. The hole should then be again filled with the manure and packed down firmly. The bed is then covered loosely with excelsior or straw to retain the moisture and to prevent a too rapid fall of temperature. At the end of about a week this material is removed and the beds are then covered over with an inch to to an inch and a half of rich loamy soil.

The object in casing the beds with soil is to retain the temperature within the material, which is necessary for the maintenance of the growth, and it also provides a firmer and cleaner substratum in which the stems of the mushrooms are mostly formed and they are thus cleaner when picked. In from 6 to 7 weeks mushrooms should begin to appear.

HARVESTING AND YIELD.

Mushrooms are ready to pick about the time the gills beneath the umbrella portion are a bright pink color. They remain in an edible condition until the gills become dark brown or even black, providing they are not decayed. If a hole is made in the bed in removing the mushrooms it should be filled in again with soil. The beds will need an occasional sprinkling with tepid water, but should not be made very wet. Too much moisture causes the mushrooms to damp off or rot.

The yield of mushrooms at the New York Cornell Station was at the rate of about two pounds per square foot of surface. The manure or the beds was composted the last of October and the beds spawned November 23. The first mushrooms were picked January 1, or about five weeks after spawing the beds. A week later regular picking began, and the beds continued in bearing for about three months.

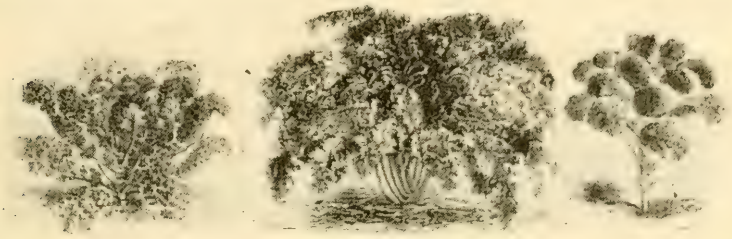
MUSTARD.

Mustard may be grown for profit, for home consumption, home markets and shipping to Northern, Eastern and Western markets during fall, winter and spring months. Mustard is used principally as greens, like spinach

and turnip tops; many consumers prefer it to all other greens on account of its peppery and sharp flavor.

SOIL.

Any ordinary garden soil suitable for turnips or cabbage suits mustard; it being a rank grower and feeder, prefers rich land well fertilized with most any kind of manure containing a liberal share of phosphoric acid.



MUSTARD

Nitrate of soda is an excellent fertilizer for mustard. Mixed fertilizer for mustard should be applied at the rate of about 1000 pounds per acre. The main idea is to get mustard to grow quickly, to be crisp, tender and palatable.

SEEDS.

The Giant Southern Curled is considered the best; in fact, it is used more than any other variety; the Dwarf Nasturtium is another favorite.

PLANTING.

After the ground is well prepared, mustard may be sown broadcast in beds and thinned out for market as it matures.

SHIPPING.

Mustard is usually tied in bunches and shipped in hampers, crates or barrels by express; when shipped by express the barrels must be well iced with cracked ice all through the barrel, otherwise the mustard would heat, turn yellow and become unsalable. In cars, mustard must be shipped in well iced refrigerator cars.

OKRA.

In the far Northern, Eastern and Western markets very little is known about okra and in consequence it would be risky to ship okra in large quantities to those markets. As far north as Kansas City, St. Louis or even

Chicago, there is a limited demand for okra, but farther north the demand would be wanting.

Okra nevertheless is a very popular vegetable in all Southern markets and always salable, the price being regulated by the supply. Okra comes to us highly recommended by the medical profession as a very healthy, nourishing product, and it matures at a time when all other vegetables are scarce and burned out in midsummer; therefore the cultivation of okra should be encouraged, as also the demand is constantly increasing every year in the South as consumers become more accustomed to its use.

SOIL.

As far as soil is concerned, okra will grow anywhere—on stony, rocky, heavy clay, black land or sandy land. Wherever the seed will sprout okra will grow and make a crop, depending on the nourishment available in the soil. To force okra to mature early, when prices are high, the Southern gardener usually manures quite heavily. For okra most any kind of manure will accomplish the object.

SEEDS.

Louisiana is the headquarters of the South for cultivating okra for shipment and also for the manufacture of the celebrated gumbo. The gar-

OKRA

deners of Louisiana use principally the Early French Market okra and a kind called the Ladyfinger for seed, and which kinds we also recommend for other prospective growers of okra.

PLANTING.

Okra is best drilled in rows 3 feet apart like corn, as soon as danger of frost is over, and then cultivated with the hoe and horse cultivator until

the young pods are forming; then no further cultivation is required, as it will outgrow any weed after that period.

PICKING AND PACKING.

As soon as okra begins to bear the young pods should be cut every day while they are about two-thirds grown and still young and tender. It is advisable to use a sharp knife and also gloves on the hands. Handling okra with the bare hands is usually followed by a disagreeable prickly sensation on the skin.

Okra should only be shipped in small packages, like the one-third bushel box, one-half bushel basket or hampers, no ice being required by express shipments.

ONIONS.

BERMUDA ONIONS.

The unusual success of the Southwestern onion growers past seasons, netting about $500 per acre on Bermuda onions, has caused many inquiries to reach the author of this book, asking for complete information about growing Bermuda and other onions in the South, and we feel compelled to treat onion culture in a somewhat lengthy article. Many ask, can we grow Bermuda onions in our section? To those we wish to say Bermuda onions may be grown to perfection in every county of the Southern States, with

or without irrigation, during the winter months, where the thermometer does not fall below 18 above zero; even further north, the Bermuda onion seed can be sown in cold frames, where the young plants can be protected by covering during extreme cold weather, like early cabbage, and the young onion plants set out in the open field in March or April and mature a fine

crop of Bermuda onions for harvest in late May or June, when onion prices are the highest. The onion seed for this purpose should be sown in the cold frames in November and December. In Southwest Texas or any other part of the Southern States, where extreme freezes are not anticipated, Bermuda onion seed may be sown in well prepared and fertilized beds, either broadcast or in drills, in September or October, and as soon as the young onions are the size of lead pencils they may be transplanted in the open field during November, December and January. Until the seeds are up the beds should be kept moist by watering every day in the evening.

SEEDS.

All of the seeds from which the Bermuda onions are grown are not imported from the Bermuda Islands, as the name would imply, but from Tenerife, Spain—Tenerife being an island belonging to the group of Canary Islands in the Mediterranean Sea on the coast of Spain. Many attempts have been made to grow the seed in California and other parts of the world, but so far the Tenerife seeds are the only seeds which have proven satisfactory. The seeds must be obtained fresh in the fall from responsible dealers, who make a specialty of importing only the pure seed from the islands. Two-year-old seed are not advisable for use. The new crop of seed arrives in this country in October, and it is usual for growers of onions to order their seed ahead of that time for prompt delivery. There are three distinct varieties of Bermuda onions—the Crystal Wax, the White and the Red Bermuda. The Crystal Wax is the most showy and rich, possessing a fine flat shape and a creamy wax color. The seeds of the Crystal Wax are higher in price and more difficult to obtain, only a few hundred pounds being grown and all are generally engaged before it ever arrives in this country.

The White Bermuda is the next best and is used more generally than the other two kinds. The Red Bermuda is also a good onion, but does not compare in demand and prices with the Crystal Wax or White Bermudas.

SOIL.

It is fortunate for the Southern grower that nearly all of our lands make good onions; the red lands, the waxy black land, the hogwallow or prairie, all yield good harvests. We can not recommend an over-sandy land, stiff lands being preferable; while some lands even without fertilizer may grow a good yield of onions, it is equally certain that manures rich in ammonia, potash and nitrogen are a great help, if not essential, and we advise and

arge fertilizers, in all cases to insure absolute success, about 1000 pounds to the acre.

THE SEED BED.

Make your seed beds in September or October, allowing 350 to 400 square feet of bed to every pound of seed. Sow in drills rather thickly, not over six inches apart and less than one-half inch deep. Keep the soil well watered. A little coal tar in the water will assist in keeping off any insects; gradually diminish the supply of water. The planter should know that onion seed will not germinate in a high temperature. The best results are had by planting the seed when the weather has become cool.

TRANSPLANTING.

Don't let the roots of your seedlings become dry. When the seedlings are pulled from the seed bed, clip off two-thirds of the roots and three-fourths of the green growth. Set out in the field in rows fourteen inches apart and four inches in the row, and cultivate with a wheel hoe. Should any plant fail to "take," put another in its place. Keep the cultivator moving. *Grass and weeds must be kept down.* Don't run your cultivator too deep, just deep enough to keep the extreme surface of the ground loose is just right. Your deep plowing must be done before the seedlings are set out. After the transplanted seedlings have started into growth, a top dressing of, say, 200 pounds nitrate of soda to the acre (which should be raked in), will push them along. When the bulbs are about one-half grown, apply 50 to 100 pounds of acid of phosphate to the acre (raked in lightly), which will intensify the coloring and develop the flavor of the bulbs.

HARVESTING.

Do not pull your onions until they are thoroughly matured. As soon as pulled, transfer them to where they can dry off in the shade. The earliest onions can be packed in crates and shipped to Northern markets where they will obtain top prices. Sun cured Bermuda onions are not good keepers.

YIELD PER ACRE.

The Texas Experiment Station reports a yield of 13,152 pounds of Red Bermuda onions to the acre. Individual growers have produced as high as 30,000 pounds to the acre, and many growers have received as high as 2½ cents a pound for their entire crop. It will thus be seen that profits on Bermuda onion borders on fiction, and even at these prices there was not

enough Bermuda onions grown to supply the demand last season, although over 1000 cars were shipped from Southwest Texas alone.

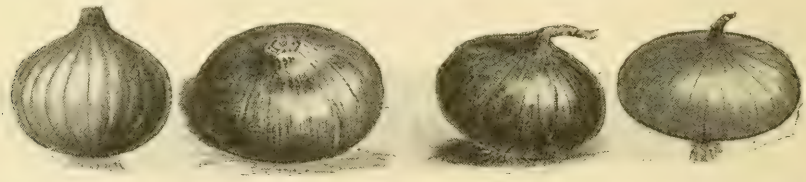
PACKING.

As a rule Southern Bermuda onions are packed and shipped in the Cummer folding crate, standard size, 24 inches long, width 6¾ inches and depth 16 inches, holding about 58 pounds or one bushel. Bermuda onions may be shipped without ice either by express or freight, providing the onions are well cured and thoroughly dry. By following the above directions anyone may grow Bermuda onions successfully in the South.

CREOLE ONIONS.

There are many excellent onions for the Gardener's use, such as the Australian Brown, Prizetaker, Silverskin, Yellow Danver and White Queen, but experience has taught us that the Bermuda and Creole onions are the best for Southern growing, when shipping onions to market for profit is the object. As this work only intends to treat of vegetables adapted to the South, we confine ourselves in this onion discourse to those two fine and remunerative varieties—the Bermuda and Creole.

We have always considered the genuine red and white Creole onions to be the best all-around onions for the Southern growers. They originated in Louisiana, showing that the Creole onions are indigenous to the Southern climate. They will stand more drought and heavy rains than any other onions, and growing more in the ground (and not on top of



CREOLE ONIONS

the soil like the Bermuda) they stand heavier freezes in the winter than the Bermuda onion. We have had Bermuda onions frequently killed, when the Creole escaped unhurt, but the best point of all is the keeping quality of the Creole onions. They do not have to be rushed on a low market. They can be kept until prices are right. Creole onions harvested in May can be kept all summer simply by spreading them out on a dry floor. The Creoles are solid, well shaped and salable onions in any market.

The intelligent French Creole gardeners of Louisiana have grown these

onions for over fifty years, almost to the exclusion of any other onions, because the Creole onions have proven to be money makers, and we strongly advise all of our readers to give these onions a fair trial.

SEED.

There are two varieties of Creole onions, the red and white; the red is more generally grown. The seeds may be obtained from any reliable seed dealer.

SOIL.

Like all members of the onion family, Creole onions succeed best in a rich alluvial, slightly sandy, soil; a damp soil is preferable to a dry soil. Deep plowing and preparing the land in as fine a tilth as possible is of good advantage.

FERTILIZERS.

Well rotted stable manure is a suitable fertilizer. Fresh stable manure should not be used, as it is apt to burn out the crop and may contain weed and grass seeds, which make the cultivation more difficult; for this reason we have always preferred commercial fertilizers, applying about 1,500 pounds to the acre. The fertilizer should contain: nitrogen, 4 per cent; actual potash, 7 per cent; available phosphoric acid, 6 per cent.

PLANTING.

Sow the seeds in drills 2 feet apart, and when the plants are partially grown, of sufficient size for green onions, thin out, leaving one or two plants every 12 inches. The green young onions may be shipped for table use, and can be converted into a source of profit by tying in bunches and shipping to market, as green Creole onions make a delightful dish. In the South commence to sow the seed after September 15th and you may continue to sow in intervals until February.

HARVESTING AND SHIPPING.

After the tops show a little yellow and begin to droop, the onions are ready. Pull the onions and place them on the barn floor or shed and dry out thoroughly. Pack and ship either by express or freight in bushel boxes, hampers or barrels. If the onions are dry, no ice is required in shipping either by express or carlots by freight.

Under normal conditions an acre of Creole onions will produce 20,000 pounds or more, depending on the richness of the soil and manner of cultivation.

ONION SETS.

TO GROW ONION SETS.

A clean, sandy soil, free from rubbish, weeds, stones, etc., is one of the first essentials. It need be only fairly, not excessively, rich to produce a good crop of sets. Apply a moderate coat of fine, old manure, or a half ton of some good complete fertilizer or vegetable manure; plow and fit the soil thoroughly so as to have a clean, smooth surface. Use the Philadelphia Silver Skin (White Portugal) for white sets, the Yellow Dutch (Strasburg) for yellow, and Australian Brown or Extra Early Red for red sets. Prize-taker makes some good, long-keeping yellow sets which in turn make very fine, sweet bunch onions. Sow seed as early in the spring as you can get

ONIONS FROM SETS

around to it, in rows a foot apart, using 30 or more pounds of seed to the acre. Otherwise treat the patch as you would treat a patch of ordinary onions, except that no thinning is to be done. When the majority of the tops have died down, in the fall, take the little sets up by running a garden trowel under the row, from the end, and throw them into a sieve, sifting out sand and dirt. Store in shallow layers under shelter until well cured, then clean and store them for winter.

Onion sets are grown more to produce young green onions for table use than for a matured dry crop, seeds being more profitable to use for a dry crop.

By following the above directions any gardener may grow sets for his own use, or for market, for which there is always a good demand.

PARSLEY.

Parsley is used mostly for seasoning and ornamenting dishes for table use. The cultivation of parsley is not advisable to any large extent, as the demand at all times is practically limited.

SOIL.

Parsley will thrive well in most any good garden soil, suitable for lettuce or cabbage. The main idea is to get it to grow quickly, to be tender and salable.

SEEDS.

Either the plain parsley or the Champion Moss Curled Parsley are favorite varieties for the market gardener.

PLANTING.

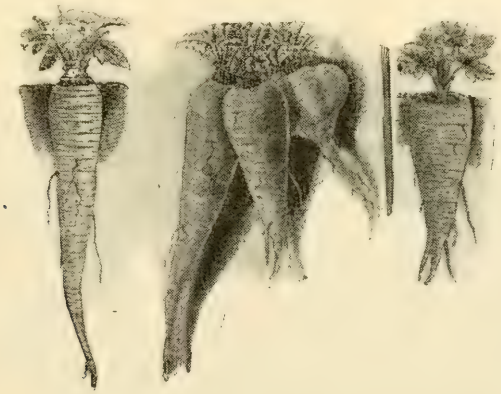
Sow in bed broadcast in the early fall and continue to sow until February, in order to have parsley in succession.

PACKING AND SHIPPING.

When parsley is of sufficient size, about eight inches high, it is ready for market; pull the plant and cut off all roots short, and tie in small bunches; pack, and ship by express in bushel boxes, hampers or barrels. In barrels parsley must be well iced with cracked ice in layers throughout the barrel, otherwise it is liable to heat, turn yellow and become unsalable.

PARSNIPS.

Parsnips are not generally grown in the South. The value of parsnips as a culinary vegetable is not known to many Southern gardeners, and yet



PARSNIPS

parsnips is an excellent crop to grow for profit, as many consumers prefer parsnips to any root crop. For stock food the roots are richer than either carrots or turnips, especially for dairy purposes. On favorable soils

parsnips will produce an enormous crop, and the cultivation is easy and inexpensive.

CULTURE.

They do best on a deep, rich, sandy soil, but will make good roots on any soil which is deep, mellow and moderately rich. Fresh manure is apt to make the roots coarse and ill-shaped. As the seed is sometimes slow to germinate, it should be sown as early as possible, in drills two feet to two and one-half feet apart; cover one inch deep and press the soil firmly over the seed. Give frequent cultivation and thin the plants to five or six to the foot.

HARVESTING, PACKING AND SHIPPING.

In the fall, when the tops are turning yellow, the roots are ready for market; they may be plowed or dug out with the spade, and left in the field for a day or two to dry.

Parsnips should only be shipped in barrels, by express or freight. For winter use, the roots may also be stored in the cellar or roothouse, in the same manner as sweet or Irish potatoes.

ENGLISH PEAS.

HOW TO PLANT, GROW AND SHIP.

Peas commonly known as English peas are in excellent demand in all markets North or South, East or West, all through the fall, winter and

ENGLISH PEAS

spring months. We have ourselves shipped peas to Northern markets for many years, and have never met with a glutted market, or that shipments did not meet with ready sale at excellent prices. The pea is a

universally favorite vegetable with all classes, especially in the early spring, owing to its succulent qualities and nourishing properties. Peas are not difficult to grow and by following the directions below, anyone, even the beginner, can make a success.

SOILS AND FERTILIZERS.

Peas succeed best on a warm, loamy soil; we would not advise to plant peas on sandy soils. Fertilizers—No nitrogen is needed beyond a small amount to give plants a vigorous start; use from 600 to 800 pounds of some good standard manure containing a fair proportion of actual potash and available phosphoric acid. Well rotted stable manures are also good, if not applied too heavily; if applied too heavily the peas will grow too much to foliage and not to fruit.

SEEDS.

There are two distinct varieties of peas; one is called the dwarf or bush pea, and the other the running or climbing pea. The dwarf pea requires no staking and the climbing pea should be staked with brush, sticks or wire. We have always found the climbing pea the most productive and profitable. In the South the Alaska dwarf pea and the Philadelphia Extra Early are the most popular of the dwarf varieties. The dark green color of the pods make them excellent peas for shipping long distances. They are very early and uniform growers, and popular sorts with canners and all shippers.

Among the climbing varieties the large white marrowfat is considered the best. As the vines are very hardy, strong, vigorous and productive, the pods have a fine appearance, usually well filled with good peas.

PLANTING.

After the ground is thoroughly pulverized by deep plowing and harrowing, the dwarf varieties should be planted two and one-half feet apart, and the climbing varieties four feet apart, covering the seed about two inches. Like all other vegetables, peas love frequent shallow cultivation, which should be done with horse cultivator and followed with the hoe.

PACKING.

After the pods are well filled the peas should be picked when the vines are dry from either rain or dew, taken to the packing shed and assorted, throwing out all faulty and overgrown, tough peas; ship only the best. Peas should be packed in one-third bushel boxes or one-half bushel baskets. No ice is required when shipped by express; if shipped in carloads the cars must be well iced.

MARKETING.

Peas can be planted in the South generally in the months of October, November, December, January and February, using the dwarf kinds for spring plantings. The cost of seed is from $2 to $3 per bushel, and it takes two bushels to plant one acre. The yield from one acre under normal conditions is about 150 bushels of green peas of the climbing varieties, and 100 bushels of the dwarf varieties. Green peas sell from $1 to $3 per bushel in all markets.

PEPPERS.

HOW TO GROW, PACK AND SHIP.

Tabasco Peppers and Egg Plant—What season to plant seed?
What manner to plant seed?
What variety seed and where secured?
Cost of seed to transplant an acre?
What season ready for market and where?
In what manner transplanted and how thick?
What amount of irrigation required?
As to the cultivation?

As the use of the pepper is so universal and the demand at all times brisk, especially in the Southern States, we advise the growing of peppers by all of our readers, from small to large patches for profit.

The culture of peppers is not difficult; it is, as we may term it, a semi-tropical plant and thrives best in warm latitudes, and all of the Southern

PEPPERS

States offer both good fields and markets for peppers, for, it must be known, very little of the peppers consumed in the South are grown there,

most of it being imported from foreign countries and particularly from Mexico in the dry and cured state.

All varieties of peppers love a loose, heavy soil, rich with humus, which must be well prepared and made specially rich with well rotted barn yard, sheep or chicken manure; well rotted leaf mold, mixed with commercial fertilizer, is also a very acceptable manure for peppers.

First, prepare your beds the same as for tomatoes and egg-plant, and sow your seeds as soon as ground is warm for plants. Water freely until plants are nice and stocky; do not sow seeds too thickly; if sown too thickly, the plants should be once transplanted in the beds to make them hardy and able to stand the transplanting to the field.

Now prepare your land well and transplant your pepper plants in rows two feet apart, and the plants one and one-half feet in the rows. Follow with clean cultivation with horse cultivator and hoe, and under ordinary cultivation you will make a splendid crop of peppers, of pleasing sight and remunerative results.

SEEDS.

The best and most profitable varieties of peppers are: First, the Sweet Peppers, either the Ruby King, Bell or Bull Nose; these are very popular and are used as a salad when green, and are now shipped by many truck growers to city markets, where they find ready sale at from $1.00 to $3.00 per bushel, especially in the early season. Second, Tabasco. This variety is very strong and in great demand by pickling factories, and splendid for home use. The plants are very prolific. The Tabasco sauce is made from this variety. Third, the Chili, a small variety from three-fourths to an inch long, which is much used for sauce and chili concarne. Fourth, Red Cluster. This pepper is very hot and also ornamental, and a great favorite with many housewives. Fifth: Celestial is probably the handsomest pepper grown. The plants grow stout, upright, produce a large number of fine colored pods and as they continue to bloom and set fruit during the season, the pods are of different colors, first a light green, then pure white, bright yellow and finally maturing into a bright scarlet color. We commend this variety highly to our readers.

Peppers require little moisture and no irrigation is required, unless it may be in the arid region. It thrives best on well drained land. The seed can be bought from any seed dealer. The cost of seed ranges from $2 to $4 per pound. Six ounces of seed will make enough plants to plant one acre.

MARKETING.

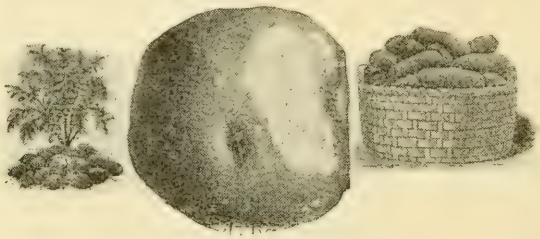
The green peppers used for slicing as salads should be picked daily and packed either in one-third bushel boxes or one-half bushel baskets.

Peppers must be well dried and cured, packed in barrels or crates and offered to merchants and pickle factories.

IRISH POTATOES.

HOW TO GROW, CULTIVATE, HARVEST AND SHIP TO MARKET.

The growing of Irish potatoes in the Southern States for the Northern, Eastern and Western markets is, comparatively speaking, of recent origin; even ten years ago the State of Texas, which now ships hundreds of cars, produced but a small crop each year, and that was more for home consumption. The author himself raised a fine crop some twenty years ago, but found a limited market in harvest time, selling from 20 to 30 cents per bushel. It is rarely now the Southern grower receives less than twice that amount, and this price, with a good demand, has stimulated



IRISH POTATOES

the industry and makes the growing and shipping of new potatoes to market profitable. The Irish potato only occupies the land for a short time, and other crops, like corn, cotton and forage crops, may be grown after the potatoes have been harvested.

SOIL.

The soil best adapted to grow Irish potatoes is a loose, sandy loam, brought to a high state of cultivation by frequent plowing and harrowing. The ground must be subject to complete drainage, as water must never stand in a potato field. There is really more liability of losing an Irish potato crop by excessive rains and moisture than by drouth in the spring.

SEEDS.

With hardly any exception, the Southern growers have adopted the Red Bliss Triumph as the standard. It seems to yield better and mature earlier than any other kind. We recommend the Triumph for seed. The seed is usually grown and secured from Maine, but lately other localities

furnish the seed; some growers even prefer seed potatoes grown at home, especially for fall planting.

HOW TO CUT AND USE THE SEED.

This is an important subject, as often complete failures are made by the want of proper knowledge of how to plant the seed. In the South Irish potatoes planted in the fall must be planted whole, regardless of the number of eyes; if cut they will invariably rot in the ground.

Spring planting is different. Potatoes should be cut for best results in the spring; the ground is cooler and the potatoes possess more vigor to grow. According to the various experiments by ourselves and experimental stations, two eyes are the best by all odds, and results have shown the following:

1st best	2 eyes
2nd best	3 eyes
3rd best	1 eye
4th best	4 eyes

FERTILIZERS.

Well rotted or old barnyard manure can be used to advantage, but green stable manure should never be used on Irish potatoes, as it makes the young potatoes invariably scabby and unsalable at any price. Experience in the past has taught us that commercial fertilizers, intelligently applied, give the best results. The most complete fertilizer for Irish potatoes we ever used was:

Cottonseed meal	500 lbs.
Acid phosphate	250 lbs.
Kainit	250 lbs.

On one acre, by using proper seeds and applying good cultivation, anyone can grow a splendid crop of Irish potatoes by following the above formula.

PLANTING.

After the ground has been thoroughly plowed and harrowed, lay off the rows two and one-half feet apart, making a slight furrow, into which drop the pieces of potatoes every ten inches apart; cover with the hoe or turning plow. Just before the potatoes come up, run a light harrow over the ground to break the crust, and also to kill young weeds or grass. After the potato plants are about six inches high, commence to cultivate with the horse cultivater, followed by the hoe. Two or three cultivations during the growing season are generally sufficient to secure a good crop.

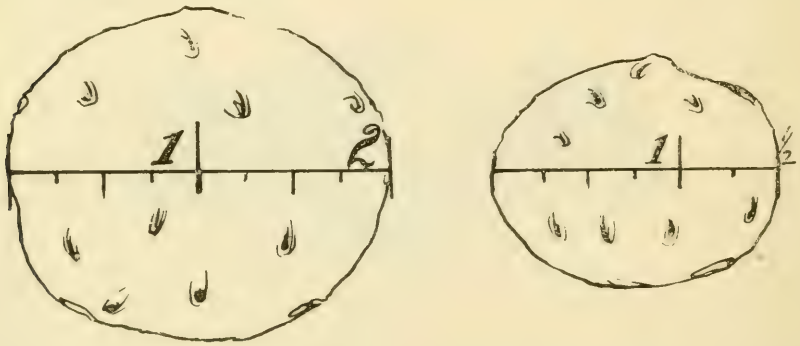
Do not cultivate too late; after the young potatoes are about one-third or one-half grown all cultivation must stop.

INSECTS.

The Colorado potato beetle is the worst enemy of the Irish potato, and the tops of the potatoes should be sprayed or dusted with paris green. For formula and manner of applying, read part 4 of this book, treating on insects.

HOW TO DIG, ASSORT AND PACK IRISH POTATOES.

Irish potatoes should be dug, or plowed out, and never left in the sunshine. Some experienced potato growers in the South are so particular about this that they will only dig potatoes late in the evening, so as to avoid sunshine as much as possible. Irish potatoes should be thoroughly



cleaned from all dirt, and carefully assorted as to size. Special machines are on the market for this purpose, and we advise the use of the same by all shippers, as no potatoes less than two inches in diameter should ever be packed in any potato car.

In the very early part of the season, small potatoes, even before they are ripe or grown, may be shipped by express in small lots, as they form a delightful dish, with green English peas, and are in good demand in all markets, but for regular shipments nothing less than two inches should be used.

On this page we produce two potatoes (see above), one two inches in diameter, the other one and one-half inches in diameter. It is a positive loss to the shipper to ship any potatoes in a car that are less than two inches in diameter. The little potatoes add only to the freight bill and detract from the price of the marketable potatoes, and in this way act detrimentally in two ways. A difference of 15 or 20 cents per bushel in a car cuts into the net proceeds, and the small potatoes are responsible for the cut. On

the other hand, the little potatoes are worth nearly as much to the farmer as the big ones; they are good for home use, for stock and seed for fall planting, as they keep much better than the large potatoes, and usually a grower can get $1 a bushel for the small potatoes for seed, in the fall.

HOW TO PLANT IRISH POTATOES FOR A FALL CROP.

Nearly all of the Irish potatoes consumed in the Southern States during the fall and winter months are imported from the Northern and Western States. The freight charges on these potatoes range from 40c to 50c per bushel. No matter how cheap the potatoes may be in the North or West, the freight has to be paid, and therefore Irish potatoes during fall and winter months sell from 75c to $1.00 per bushel in any Southern market. In fact, they have to sell at those prices to leave any profit to the Northern shippers. It follows, if we grow the potatoes in the South and save only the freight charges, we are bound to obtain fair prices for every bushel of potatoes we offer in the fall and winter months. There is also always a good demand for seed for spring planting. Why should we pay one dollar and a dollar and a half for seed potatoes, when we can grow them just as good in the South if we try? Many growers even claim Southern seed potatoes are the best. We know by experience that they are just as good.

The most difficult part of planting Irish potatoes in the fall is to get them to come up even. Irish potatoes for fall planting must never be cut. They must be planted whole. Some growers advocate sprouting the potatoes before planting. Others condemn it. When properly done, sprouting the potatoes before planting is by all odds the best.

SPROUTING.

Clear off a sunny piece of ground, well drained, and lay your small seed potatoes from 4 to 6 inches deep. Now cover with straw or hay 8 inches deep. If a rain should now come, all the better; if not, water the straw heavily and watch your potatoes closely. Keep the straw moist, not too wet; in about ten days or two weeks small sprouts will appear on the potatoes. When the sprouts are one-fourth or one-half inch long the potatoes are ready to plant in the field.

PLANT ABOUT AUGUST 15TH OR SEPTEMBER 1ST.

It is very important, when planting potatoes in the fall, that the ground is well prepared, by deep plowing and harrowing. Lay off your ground in rows two and a half feet apart and drop your seed in the fresh opened,

cool, moist earth; cover at once and do not let the furrow dry out and let the sunshine on your sprouted potatoes.

Past results have pointed to the fact that potatoes must be planted deeper in the fall than in the spring—at least six inches deep—away from the hot top soil and rays of the hot sun.

When these directions are carefully carried out a good stand may be expected.

FERTILIZERS.

The most complete fertilizer for Irish potatoes we ever used on one acre was:

Cottonseed meal	500 lbs.
Acid phosphate	250 lbs.
Kainit	250 lbs.
Total for one acre	1,000 lbs.

There are many other good commercial fertilizers, that can be used to advantage, and which can be procured from manufacturers who make special manures for potatoes. We cannot recommend green stable manure for fall planting of Irish potatoes, as it is too heating, and makes them scabby.

As soon as potatoes are up or even before, the crust must be broken and kept broken by constant cultivation, to allow the cool winds to penetrate the soil, and it also serves to retain the moisture in the ground, which is essential for all fall gardening.

A POTATO HOUSE.

Dig the potatoes and lay them in the shade for about one-half of the day, then bring them up and put them in the potato house, and you will never lose any of them. We have kept potatoes for three years this way.

Potato house.—Dig your house fifteen feet long by five in width, one and one-half feet deep; then set a forked post in each end and also one in the center for the ridge pole to rest on. Then place poles from the ridge to the ground on each side up close to one another; then on top of that place some straw or hay and then put on your dirt, and your potato house is done, except the ends. We tacked net wire over ours so the chickens could not get in and then spread some cotton sacks over that, lacking a little of coming to the bottom, so the air could pass through. Of course, when it rains we put some oilcloth over each end to keep out the water, but just as soon as the rain is over we take that off. Be sure to run your potato house north and south and place your door in the north end. At present we have our house full of potatoes. They have

been put up about six weeks, and are just as sound as can be. To keep from freezing in the winter, earth may be applied all around and to the top, leaving one or two vent holes. Sweet potatoes may be kept in the same way.

HOW TO GROW AND HARVEST SWEET POTATOES.

The sweet potato thrives only in a warm climate and soil, therefore the Southern States offer the best fields. In the Northern States, a small sweet potato, such as the Nansemond and Jersey Sweet, is grown with profit, and could be grown in the South and shipped to Northern mar-

SWEET POTATOES

kets with good results, as earliness would be an object. The seed potatoes should be bedded in hotbeds in January, protected during cold weather and set out when danger of frost is over.

SOIL.

The sweet potato will grow in most any kind of soil, providing the land is subject to drainage; a slightly sandy soil is always preferable, as it makes the cultivation and harvest more easy. No fertilizers are required, unless the soil should be exceedingly poor; in fact, fertilizer may prove a detriment, as it may induce too many vines in place of tubers, but fertilizers may be used on the smaller earlier varieties with advantage when earliness is the object.

VARIETIES.

There are many useful varieties; prominent among the small early kinds are the Jersey Sweet, Jersey Red and Nansemond. Among the larger and later kinds are the Pumpkin Yam, the Southern Queen, the Vineless, Southern Red and Sugar Yam.

PLANTING.

Sweet potatoes are never grown from seed, as the plants bloom only in the tropics, similar to morning glory, and seeds can be used only to produce new varieties. The origin of the sweet potato is the morning glory.

Sweet potatoes are therefore only propagated from the tubers. for field planting, make a bed rather sandy, and lay the potatoes close together. Water moderately; cover five inches deep. In about six weeks' time regular plants will be formed, which can be pulled up and set out in the field, on ridges three feet apart. After the first planting is done, and after the sweet potatoes have produced vines, if there is occasion to plant more acreage for a late crop, during moist and cloudy weather part of the vines may be removed, cut in lengths of about six inches, and planted again on ridges, for further crops.

CULTIVATION.

Before the young sweet potato plants are firmly established and running, the hoe should be applied to keep the young grass from choking out the plants. Some horse cultivating is also advisable with the plow and sweep, through the middles, after the vines are thick and about cover the ground. No further attention is necessary.

HARVESTING.

For immediate eating or market, through the summer, sweet potatoes may be dug at any time when the size is sufficient to be marketable. For storing and winter and spring use, the sweet potatoes should be left in the ground until thoroughly ripe. This can be determined by the following test: Cut a potato in two parts; if the cut part stays dry the potato is ripe for storing; if the cut part emits a milky substance in drops, the potato is not ripe, and will not keep in storage. Sweet potatoes harvested while the ground is dry will keep better than when the ground is wet.

For market sweet potatoes may be shipped in bushel crates, barrels or sacks.

For remedies for the sweet potato borers and other enemies of the sweet potatoes, read part 4 of this book.

PUMPKINS.

Pumpkins with the farmer and truck grower are more of a side crop and cannot be depended upon as a shipping crop to any extent, although we believe the genuine old yellow pumpkins, the kind famous for pumpkin

pies, could be grown in the South and shipped early in the fall to large cities, with flattering results. Everybody eats pumpkin pie up North and they can hardly wait until pumpkin time. The South might anticipate

PUMPKINS

the want and reap a good harvest. Pumpkins also make an excellent stock food, and should always be grown to some extent on every farm. The labor is slight; dropping and planting the seed in cornfields, nooks and corners usually produces large crops, without any expense or outlay in labor. When grown as a regular crop, pumpkins should be planted in hills, ten or twelve feet apart, similar to watermelons. Fertilizing increases the crop. Rotten stable manure is as good as any. Commercial fertilizers should be used at the rate of about 800 pounds to the acre in the hills, well mixed with the soil.

SEEDS.

Favorite kind is the Large Cheese or Field Pumpkin. It is of round flat shape, salmon yellow in color, and a desirable kind. In the Southern cities a great favorite is the Kershaw crookneck for table use, which can be planted with profit for Southern markets only.

The Mammoth Tours pumpkins are famous for their size, and frequently weigh from 100 to 125 pounds. It is of a grayish yellow color; flesh is coarse-grained and fine for stock feeding. Where size is an object, we recommend this variety.

RADISH CULTURE.

Most truckers regard the growing of radishes as insignificant, and yet it is doubtful if there is a single vegetable more profitable than radishes, if properly grown and marketed. Radishes should only be grown on light, mellow soil, well prepared before planting and heavily manured. To be palatable, radishes must be grown quickly.

SEEDS.

While there are many kinds of radishes, the Chartier Half Long, the White Tipped French Breakfast, Half Long Deep Scarlet, Scarlet Globe and Chinese Rose are the most favorite with all Southern gardeners. The Chartier is a tender, juicy radish; the French Breakfast a showy,

RADISHES

exquisite radish. Neither of these, however, will stand any very low temperature. The Chinese Rose is hardy, practically an ideal winter radish, as even the hardest freezes do not kill it, and it is, therefore, planted to a large extent by Southern growers.

Radishes can only attain quick growth, obtain good shape and be of crisp texture in rich, loose, mellow, alluvial soil, containing humus. It is useless to attempt to grow palatable radishes in harsh, hard or rocky soils.

FERTILIZERS.

As quick growth in radishes is desirable, special manures become valuable agents. There is nothing better than well rotted stable manure, because it contains all the elements required by radish growth, but where commercial fertilizers will have to be substituted, use 1,000 pounds per acre, broadcast, fertilizer containing at least nitrogen 5 per cent, actual potash 9 per cent, available phosphoric acid 6 per cent.

PLANTING.

The planting can be done by broadcasting or in drills 18 inches apart. We prefer the drills, because they are more easily gathered and some

cultivation can be bestowed on them, which is good for all vegetables. It takes about 10 pounds of seed to the acre, if sown in drills, three times as much as if broadcasted.

HARVESTING AND PACKING.

As soon as the radishes attain their growth, they should be pulled, discarding all of a spongy nature, which can be ascertained by a gentle pressure of the fingers; the long, small roots trimmed off, as well as any excessive top; now tie in bunches of twelve to the bunch. Radishes are generally quoted in the markets at so much per dozen; this means a dozen bunches of twelve radishes each. The price ranges from 30 cents to $1.00 per dozen bunches, according to demand and supply. When shipping in refrigerator cars, the bunches can be packed nicely in layers in either barrels or boxes. The barrels should be cut open on the sides for ventilation.

When shipping by express, radishes should be shipped in barrels with cracked ice—put down a layer or radishes, then cracked ice, and so on until the barrel is full. The amount of ice should be gauged by the distance and time to market, from 10 to 25 pounds per barrel.

MARKETS.

Radishes are relished by nearly everyone: therefore any town from 500 to 50,000 inhabitants presents profitable markets. There are thousands of small towns in the North, East and West that might be supplied by express shipments during the months of December, January, February and March. Large cities are more profitably reached in carlots.

RHUBARB.

HOW TO GROW AND SHIP.

Rhubarb is grown solely for its fleshy and juicy leaf stalks, which must quickly reach their full size, and for which result a deep, very fertile soil is essential. Moist lands are preferable, as warmth, moisture and fertilizer are the three requirements for growing rhubarb; and yet rhubarb resents a hot climate, and will not do well in the extreme South, but we believe rhubarb could be grown in the South in sheds during the winter months, with remarkable success, and we look for this industry to flourish some day, when the cultivation under sheds will be inaugurated. In planting in the South under shed, the roots should be imported from the North every fall for the purpose.

Rhubarb is only propagated by the roots, similar to asparagus, which are planted in rows three feet apart, and eighteen inches apart in the

RHUBARB

rows. Heavy fertilizing is more important than cultivation after the roots have started to grow. Liquid manure is highly recommended for rhubarb.

HOW TO GROW, PACK AND SHIP TURNIPS OR RUTABAGAS.

SOILS AND FERTILIZERS.

It is generally supposed that turnips or rutabagas will do well on any soil and with scarcely any fertilizing. This is a mistake. Turnips or rutabagas should be planted in the South on light, loamy, well manured land. Cottonseed meal broadcasted is an excellent fertilizer for turnips, and so is well rotted stable manure. If other manures are used, use 600 pounds per acre, especially manures that contain nitrogen, actual potash and available phosphoric acid.

The intention of using manures is to stimulate quick growth, as no vegetable is palatable or salable if grown slowly, and is tough in consequence.

PLANTING.

The ground for turnips or rutabagas should be well plowed and harrowed, and thoroughly pulverized. This also tends to quick growth. They can be sown broadcast. Most truckers sow in rows two and a half feet apart, and thin out to a stand. This is more preferable as the crop is more easily gathered and taken care of, and some cultivation can be given between the rows, which is also good.

SEEDS.

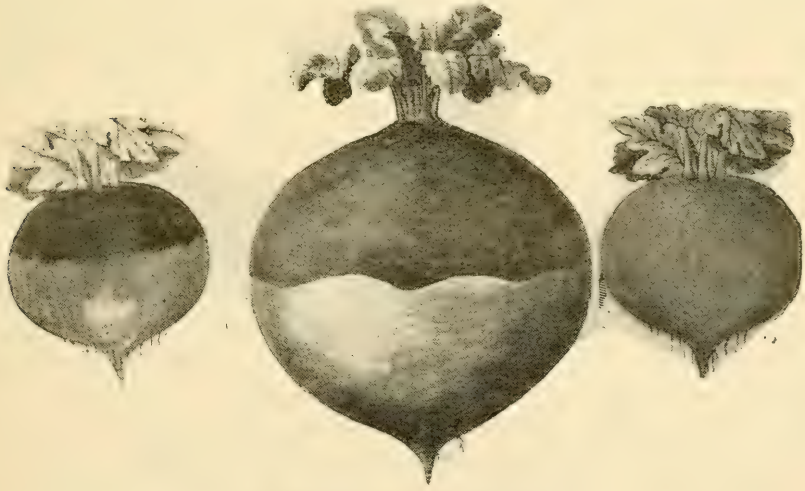
The most widely cultivated and best known variety for either home use

or shipping is the Purple Top Strap-leaved Turnip. It is round and flat, white on the bottom, and a reddish purple above the ground, which gives it a pleasing appearance, and it is a very quick grower, and by far

TURNIPS OR RUTABAGAS

the best seller. Some truckers sow the Purple Top Globe and White Globe with very good results.

For rutabagas the Yellow Globe is considered the best. Turnips and rutabagas should mature in 50 to 70 days from the sowing of the seed. It takes four to five pounds of seed for one acre if broadcasted, one-half the



TURNIPS OR RUTABAGAS

amount if sown in drills. In the South they should be sown in August, September, October, November, December, January and February. Turnips and rutabagas can stand 12 degrees below freezing without injury, or even lower, depending somewhat on their age and condition.

PACKING.

Turnips and rutabagas should be tied in bunches like beets or radishes. Pull from the field when the size is about that of a dollar or slightly larger; place six in bunch; if larger, only three in the bunch. While washing adds greatly to the appearance of all vegetables, yet it is a poor plan for shipping long distances. Vegetables of all description carry better if not washed. Clean as well as you can without washing. This is by far the best plan.

Turnips and rutabagas can be shipped in barrels by express, using 15 to 20 pounds of cracked ice to the barrel, or in crates, well ventilated, they can be shipped without ice.

Associations and individual shippers who intend to ship mixed cars of winter vegetables should not ignore turnips, as they will turn out to be the most profitable part in the cars.

HOW TO GROW, PACK AND SHIP SPINACH.

Spinach is a very important crop for Southern gardeners, as it is easily grown, immune from heavy frosts, and always in good demand in all Northern markets. As we stated before, the Southern truckgrowers are so carried away with glowing accounts of immense profits in potatoes, onions, etc., that they are apt to ignore and lose sight of remunerative crops, such as spinach, and we hope all of our readers will at least give some attention to the growing of spinach. As a winter vegetable, spinach sells in the Northern markets from $3 to $6 per barrel, and it is no exaggeration to state that 150 barrels can be grown on one acre. The main crop in the South is sown in September and October. Spinach is best developed and most tender and succulent when grown on rich soil.

SOILS AND FERTILIZERS.

Spinach prefers a light, warm, well drained soil, containing an abundance of humus. As we have never known to what extent heavy manuring may be carried with this crop for profit, we have come to the conclusion the heavier the manuring the heavier the crop. It follows that loose cultivation, accompanied with liberal manuring, is the basis of spinach culture.

In the absence of abundant stable manure, the grower of spinach must resort to commercial fertilizers and use about 1,000 pounds to the acre, containing nitrogen 4 per cent, actual potash 9 per cent, available phosphoric acid 8 per cent.

SEEDS.

From experience we prefer the Bloomsdale Savoy Curled, as it is a heavy

cropper of fine quality, very hardy, succulent leaves, curled and crinkled like Savoy cabbage. It stands the longest before running to seed of any variety we know of, and we commend it to our readers.

PLANTING.

On well prepared land spinach can be sown broadcast. If sown broadcast it takes about twelve pounds of seed to the acre. If sown in drills two feet apart, it takes about eight pounds to the acre. We prefer the drill

SPINACH

system, as the crop is more easily gathered and some cultivation can be bestowed on it. The ground should be in fine condition when spinach is sown, neither too wet nor too dry. Cover the seed about one inch deep; always use a light roller to pass over the beds or rows after sowing.

HARVESTING AND PLANTING.

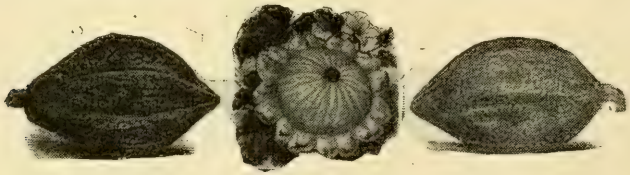
As soon as spinach attains a fair size and before it becomes discolored or tough, it should be cut with a sharp knife, like lettuce. Remove all roots and a few of the outside leaves. When shipped in cars, spinach can be packed in barrels or crates, well ventilated; when shipped by express, spinach should be shipped in barrels, packed with cracked ice in layers, else it is apt to heat and spoil. The amount of ice used should be gauged by the distance and time it requires in transit, from 10 to 30 pounds of ice for each barrel.

HOW TO GROW AND MARKET SQUASH.

The squash is one of the most nutritious and valuable of all vegetables, but must be grown and shipped in small quantities, as the demand is somewhat limited in all markets. Few farmers and truck growers recognize the value of both summer and winter squash as human and animal food. An acre of squash is easily grown, and will produce as much food for stock as an acre of corn.

SOIL.

Squash will grow rank in most any kind of good garden soil. Fer-



SQUASH

tilizers, either stable manure or commercial, will assist greatly in forcing and increasing the crop.

SEED.

For table use, there are three kinds: The Early White Patty Pan Squash, the Yellow Crookneck Squash, and the winter squash, called the Hubbard.

PLANTING AND CULTIVATING.

The Patty Pan being a bush variety, can be planted in rows three feet apart and two feet apart in the rows. This is the earliest of all squash, and the only kind it pays to ship to Northern markets. The other squash may be grown for home use, or sold in local markets. Squash should be packed in hampers, bushel crates or hampers, by express or carlots.

TOMATOES.

HOW TO GROW, CULTIVATE, PICK, PACK AND SHIP TOMATOES.

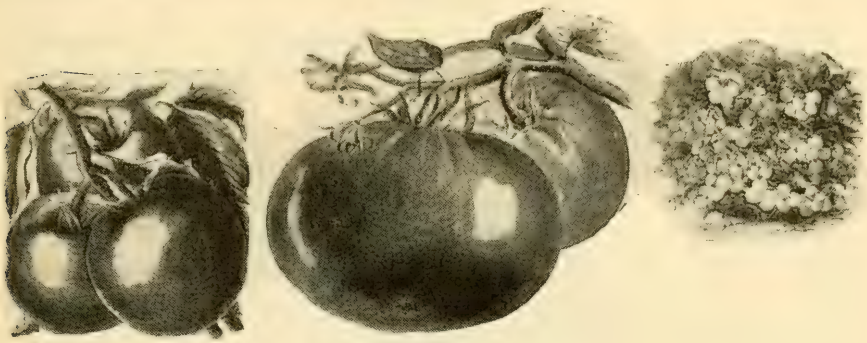
Tomatoes are by far the most important vegetable crop grown in the South for Northern markets. The growing and shipping of tomatoes is also more difficult than any other crop, and large profits, from the culture of tomatoes, can only be obtained through knowledge and experience. Earliness, qualities, appearance, selection and packing are the predominating features. It is therefore our intention to make tomato culture, both for spring and fall crop, as complete as possible, so as to assist, especially the beginner, to bring tomato culture to a successful issue.

SOIL.

It is by no means necessary to select rich, heavy ground to grow tomatoes on; in fact, light, sandy soil, well drained, sloping to the south, is much preferable.

FERTILIZER.

For an early crop to push the young plants to maturity, specific manures, judiciously applied, form useful agents and are used by all well posted



TOMATOES

market gardeners. From 500 pounds to 1,000 pounds of a well mixed high grade fertilizer and 50 pounds nitrate of soda should be used per acre, either broadcast or in drills, thoroughly mixed with the soil.

VARIETIES AND SEED.

There are many excellent varieties of tomatoes, some gardeners preferring one and some another. All agree, however, that the Livingstone Favorite, the Livingstone Beauty, the Stone, Dwarf Champion and Acme are in the lead for commercial use.

SOWING THE SEED.

The seed should be sown in hotbeds about ten weeks before it will be safe to plant in the open field. The young plants should be transplanted several times in cold frame to make plants stocky.

PLANTING.

When the ground is warm and all danger of frost is over, the plants should be very carefully transplanted. As the tomatoes like sunshine and ventilation, we recommend planting further apart than usual, say, make the rows four feet apart, and set the plants three or four feet in the rows.

CULTIVATION.

The tomato, like other vegetables, loves and thrives best with frequent cultivation both ways with horse cultivators, followed by good hoeing. This also serves to retain the moisture.

Nearly every tomato grower in East Texas, where tomato growing has become an important industry, trains all the tomato plants to stakes three feet high, tied with string in two or three places. The tomatoes are also

thinned out, by pinching off the excessive suckers. Tomatoes, to ripen properly, must have sunshine, and the foliage must be reduced to accomplish this object.

PACKING.

The most important feature that brings tomato culture to a successful issue is selection and packing. The most favorite package is the four-basket crate.

Tomatoes should be graded as to size and color—Nos. 1, 2, 3. No. 1, the ripest, for close shipment; No. 2, for further shipments, and No. 3 for farthest shipment. It is folly to run the three grades together, as loss invariably follows this mode. Small, inferior tomatoes should not be shipped at all; when you place inferior tomatoes with your good tomatoes, the good stock has to pay the freight on the poor, and you will likely get nothing for your shipments. It pays to grade—while this applies to all vegetables, it certainly does to tomatoes. The standard packages for tomatoes are the four and six-basket crates.

A FALL CROP OF TOMATOES.

The directions for growing tomatoes in the fall are nearly the same as for a spring crop, with the exception that there is no hotbed required to grow the plants. Sow the seed in a clean, open place, where the air can circulate freely, and keep a sharp lookout for the Spanish flies. Do not sow the seeds too thickly, else your plants will grow too tall and spindling. Cultivation should be done oftener in the fall, as the usual drouth may ruin the crop. Clean cultivation also checks insects. In the fall, as a usual occurrence, the insects are very much worse than in the early spring, and it may be necessary to spray a fall crop of tomatoes several times. Directions and formula for dusting or spraying tomatoes will be found in part 4 of this book, The Modern Guide.

HOW TO GROW TOBACCO IN THE SOUTHERN STATES.

SEED.

Only pure Havana or Sumatra seed should be planted, as it has been demonstrated that these varieties grow best here, besides bringing the highest market price. The Havana is grown for fillers and wrappers and the Sumatra for wrappers only.

QUANTITY OF SEED TO SOW.

Tobacco seeds are very small, smaller even than mustard seed—one ounce

contains about four hundred thousand seeds—many of them, however, may not sprout, but allowing for this, one ounce should produce enough plants for five acres.

SEED BED.

In selecting a site for seed bed, it is important that it should be convenient to water, as the young plants will require watering from time to

TOBACCO

time. Select new land; an open space in the woods is a good location, or by the side of a fence where it has not been cultivated. Give it a southern slope, where the sun can shine on it most of the day. Begin preparing the seed bed about January 15, by burning with dry wood or with brush. Do not pile the wood in a heap, but keep near the ground by replenishing the fire from time to time until the soil has been thoroughly burned to the depth of three or four inches. This is done to kill all vegetable and insect life, and give the young plants plenty of time to get a good start before vegetation begins. After burning the bed it should be broken up to a depth of about two and one-half inches, and thoroughly pulverized. Remove all foreign substance with a rake, and the surface should be left in a level and porous condition. Soil should not be worked deeper than two and one-half inches, as it would prevent the moisture from rising and might bring to the surface seeds of grass and weeds, which would quickly strangle the young plant. Frame this bed on four sides with one-inch boards twelve inches wide, placed on edge; bed may be of any desired length, but it is best not to have it over three feet wide, so that all parts of it can be reached from either side. A bed fifty feet by three feet will contain from fifteen to twenty thousand young plants, so the planter can make his bed or beds any length to get the desired number of plants. It

is best to have more plants than are actually needed, so as to have the pick of the hardiest ones for transplanting. A support for the other covering should be placed across the beds three feet apart, and a ditch dug around them to drain the surplus water.

SOWING THE SEED.

Mix the seed in the proportion of a half ounce to four quarts of wood ashes, meal or loose earth, and sow this broadcast over the bed, one tablespoon of seed to 100 square yards. Meal or ashes are preferred to earth, as the seeds show plainer and it can be seen if the sowing has been evenly done. Hold the hand close to the ground while sowing, so the wind will not blow the seed away. After sowing, go over the bed gently with a brush or broom to disturb the surface, being careful not to bury the seed too deep. The distance through which the young shoots should pass should be as short as possible. A light roller should be rolled over the bed to firm the soil, or a board can be laid upon the bed and tramped upon, which will answer the same purpose. Sprinkle the bed thoroughly and keep it moist continuously, but do not put enough water so that it will stand on the surface.

PROTECTING THE PLANTS.

A cheese cloth covering should be at once placed over the bed and held in position by headless nails, so it can be easily removed. The covering protects the beds from insects and the direct rays of the sun. It retains the moisture and makes the humidity temperature more uniform. Two weeks before transplanting the beds should be uncovered just after sunrise for an hour or two, and the time of exposure increased from day to day until two or three days before transplanting—when the covering should be left off entirely. This makes the plants hearty and vigorous, so that they will stand the shock of transplanting. The covering should not be taken off except for the purposes of sprinkling the bed and wetting it. The beds should be kept clean from all foreign growth, and if insects get in, spray the plants with a solution of paris green, using a teaspoonful to two gallons of water. If a large crop is to be planted, it is best not to sow all the beds at the same time, but allow from ten to fifteen days' time to elapse between the sowing of each. The farmer can use his own discretion, as the beds can be sowed from January 20th to February 28th, or even later.

PREPARING THE SOIL.

The land should be plowed in February, and rough manures may be worked in; cotton seed hulls are a very good fertilizer. Break the soil

deep, so that the roots may have a chance to go down, otherwise the plant will be stunted and heavy rains will not penetrate—the top soil becoming soaked—which would soon drown the roots and cause them to wilt and become useless. Just before transplanting the ground should be re-broken by a cutaway harrow or similar instrument to the depth of three inches, and thoroughly pulverized.

TRANSPLANTING.

The plants will be large enough to transplant within nine or ten weeks after sowing the seed; early planting saves much labor in fighting the worms and insects, but do not transplant until all danger of frost is past. Early planting also secures the benefit of the spring and winter rains. In Texas transplanting can commence as early as March 10th, plants to be from four to six inches high before pulling from the beds. Before pulling, water the bed thoroughly, so the soil will give as little resistance to the release of the roots as possible. No lump should be allowed to adhere to the roots. Plants should be pulled one at a time, selecting the largest and strongest. All plants do not reach transplanting size at the same time, consequently the beds will have to be pulled over several times before all the plants are used up. After pulling plants recover the beds and do not uncover again until the plants remaining in the beds are large enough for transplanting. Bed must be thoroughly watered after each pulling. Care should be taken to pack the plants straight in the baskets or boxes in which they are carried to the fields to set out, and sufficiently tight to hold them in that position, otherwise they will become crooked and make it hard to set them properly. After the plants are well pulled the beds should be raked over and a heavy covering of straw or leaves be put on to prevent the growth of weeds; otherwise the beds will be covered with a rank growth and new ones will have to be made for another year. Transplanting may be done by hand or machine; the machine is recommended to be the best mode of transplanting, as it sets the plants even and straight, and sets from four to six acres a day, according to the character of the surface of the field; it also supplies the water to each plant, covers the roots, and the plants start to growing quicker, gaining from five to ten days on the plants set by hand. Plants should be set out late in the afternoon or on a cloudy day just after a rain. They should be pulled from the bed early in the morning, when the dew is on them, as the leaves are less liable to be injured. After pulling the plants the baskets in which they are packed should be covered with a damp cloth and put in a cool place until set out; the rows should be three and a half feet apart, and the plants set from one to one and one-fourth feet apart in the rows, according to the fertility of the soil.

CULTIVATING.

The tobacco fields should be kept clean from grass, weeds and trash. As soon as the plants stand up they should be cultivated with a small sweep or cultivator, throwing a little of the light earth to the plant, stirring the middle of the row about three inches deep. As soon as the roots begin to reach out the soil is stirred only deep enough to destroy the weeds and grass and form a loose surface. Do not cut or disturb the roots, as it checks the plants' growth and tends to make the leaves coarse and woody. Stir the soil after a heavy rain to admit air and prevent excessive evaporation. The best cultivation should be given just before the plants are topped, leaving the plant on a rounded bed with a water furrow between the rows to carry off the water after a heavy rain.

PESTS.

Trouble with insects begins as soon as the plants are set, and as soon as set it is well to dust them with a mixture of paris green and meal, using one tablespoonful of the poison to a gallon of meal. When they get larger the bud worm appears. The egg is deposited by a small brown moth on the top leaf, which it destroys in a few hours after hatching. Paris green is the remedy used to destroy all pests on tobacco, used as a powder mixed with flour or meal or as a solution; if the latter, mix half pound of paris green into sixty gallons of water, or for smaller quantities, mix one teaspoonful of the poison to two gallons of water. This should be sprayed on the plants as often as necessary, but do not rely on the poison entirely. The best way to get rid of the tobacco worm is to go after him in the early morning and destroy him by hand. There have been several traps invented to catch the moth, and considerable help has been gained therefrom, but, like the paris green, they do not catch all of them, and a constant watch has to be kept, otherwise the worms will play havoc in a short time. When the leaf begins to ripen no more poison should be used, as it will injure the quality of the leaf.

SUCKERING.

When the suckers begin to appear at the base of the leaves, they must not be allowed to grow over two or three inches, but be plucked off as soon as possible, otherwise they will draw from the vitality of the plant and affect the quality of the leaf. Two suckers generally come at the base of each leaf, but not all at the same time; it is, therefore, necessary to go over the field once or twice a week, at the same time keeping a lookout for worms.

TOPPING.

It is a disputed question as to when to top the plant. If for wrappers the plant must be topped higher than for fillers, from twenty to thirty leaves being left on the stalk, according to the vigor of the plant. If for fillers, from twelve to sixteen leaves should be left on the stalk—the more leaves left the thinner the leaf; heavy body leaves are wanted for fillers, consequently the plants are topped lower down than for wrappers. More leaves should be left on a hardy plant than a weak one. This will have to be left to the judgment of the topper. In some cases in Florida the plants are not topped at all, but the plant is allowed to bloom and go to seed.

CUTTING.

Great care must be taken to cut the plant just when it is ripe, for if cut green or over-ripe it will cure with an inferior flavor and quality. The time when a plant is ripe and ready to cut is a matter of judgment and experience. There is a slight change in the color of the leaf from a dark green to a lighter shade, when it should be cut. Cutting should not be done when dew or rain is on the plant, as the water is liable to leave dark spots on the leaves. After cutting, the plant should be allowed to wilt for several hours before being taken to the barn, to prevent breaking of the leaves, which are very brittle when first cut. Specially prepared racks should be prepared and placed in a shady place in the field, on which should be hung the laths on which the plants have been strung, 10 to 12 plants being placed on each lath. With wrappers the leaves are pulled from the stalk as they ripen and placed in baskets or shallow boxes and carried to the sheds, where they are strung on twine or wire, face to face, and back to back, thirty or forty to a string, according to size of leaf; the twine or wire is then stretched on a four-foot lath and hung in the barn. The leaves are never allowed to lay on the ground. When priming is practiced the leaf should be allowed to stay on the stalk until ripe. As soon as the leaves are pulled from the stalk, they cease to mature at once; when the whole plant is cut the leaves will continue to mature. In hanging tobacco the butts are pierced by a sharp pointed stick and strung on the laths in this way, butt end up; the laths are then hung in the barn for a month or six weeks, until the sap is dried out of them. They should be taken down in damp weather, after the leaves have absorbed sufficient moisture to make them pliable and less liable to break.

TREATING THE LEAF BEFORE STRIPPED.

Close attention has to be paid to the leaf while on the stalk in the barn. They should not be allowed to become too dry or too wet. In dry weather

the ventilators should be opened at night to let the leaf absorb moisture, and closed in the day time to prevent it drying out too rapidly. In wet weather keep the ventilators closed entirely, or open them only for a short time, if the tobacco appears to be too dry. In a very damp season it is sometimes necessary to use artificial heat to prevent mold. It is not advisable to build fires on the floor unless the smoke can make its escape from the barn without coming in contact with the tobacco, as nothing ruins tobacco more than smoke. Small stoves are preferable if extra heat has to be applied.

STRIPPING.

In stripping the leaves from the stalks they should be divided into three classes, viz.: bottom, middle and top leaves. The leaves are tied from twelve to sixteen together in what are known by tobacco men as "hands." Only a sufficient quantity of tobacco should be taken down at one time that can be stripped in a day, and then not until it is soft and pliable. It should be bulked together to keep it from drying out. After it is tied in hands it is ready for the packer, and the farmer's work is finished.

WRAPPERS.

The finest wrappers are grown under shade. A framework is put up nine feet high and covered with canvas or thin slats, and walled in all around with canvas or boards; this controls the humidity and temperature, and prevents the direct rays of the sun from beating on the plants. The leaves grown under shade are very much thinner and their commercial value much greater than the tobacco grown in the open field. The leaves are allowed to remain on the stalk until thoroughly ripe, when they are primed and hung in the barn as outlined heretofore. Cultivating is the same as for the open field tobacco. The cost of building this shade is about $300 per acre, but, like a fence, will last for years if properly taken care of, and the returns will justify this extra cost. Wrappers must be handled with the greatest care so as not to break or bruise them, and in no case should they be allowed to lie on the ground, but should be placed smooth in baskets or boxes and taken to the barn to be strung on wire or twine and hung up.

LABOR.

The amount of labor to employ in raising a crop of tobacco varies with conditions and management; one man should be able to cultivate five or six acres in the South, and have some time to attend to other things about the farm, but when he is working in the tobacco field he must give his whole attention to the tobacco and nothing else. Women and children do a large

amount of the worming and suckering, and do it better than men, as they are more deft with their hands and quicker and much cheaper. There will be plenty of work for men if they are conscientious workers, but a lazy man has no business in a tobacco field, for unless he attends strictly to business the crop will very soon be ruined.

PART III.

FRUIT AND NUT CULTURE.

THE HOME AND COMMERCIAL ORCHARD.

The profits from fruit culture are so various and depending so much on certain conditions that were we to go exhaustively into the planting of the home or commercial orchard this entire book would hardly be large enough to accommodate all that might be said on the subject.

Our readers are well aware that our aim is brevity, touching only the vital points of the subjects in this work.

As far as the home orchard is concerned, planted only for home comfort and use, the selection of the proper fruits to provide a succession of fruits, setting the orchards and cultivation would be about all the knowledge required, but when orchards are set out as a commercial proposition or profit therefrom the object, there arise many other conditions to insure success or failure for the orchard.

The main question would be to reduce production of the fruit to a minimum cost, by the proper selection of fertile fruit soils; land subject either to drainage or irrigation; textures of the subsoil; easy cultivation of the topsoils; timber or other protection from severe windstorms, or proximity to market or railroad loading stations—these items may be said to constitute the fundamental principles of successful orcharding, just as sure as the lack of any of the above requirements would mean partial, if not complete, failure.

The ideal soil for fruit trees, grape vines, fruit bushes or berries is a sandy, porous loam, about eighteen inches deep, underlaid by a light colored clay or gravel, and subject to absolute drainage, eight or more feet deep. Therefore slopes of land are always preferable for the orchard in the South. Heavy, soggy, low topsoils, underlaid with heavy, sticky dark clay, should be avoided, as the root rot, blight and fungi growth would be inevitable consequences on such unfriendly soils.

MOISTURE AND IRRIGATION.

In any of the Southern States, where the average rainfall is above forty inches per annum, it would not be necessary to consider irrigation at all, but where the annual rainfall is less than thirty inches, like in the semi-arid Southwestern States, irrigation must be seriously considered and provided for in setting out a commercial orchard to guard against failures.

PROXIMITY TO MARKETS AND LOADING STATIONS.

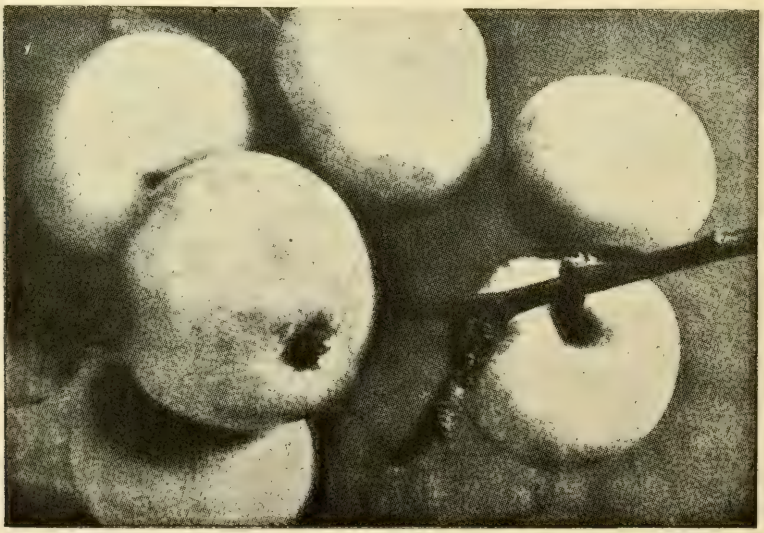
The importance of proximity of commercial orchards to loading stations is recognized to such an extent by professional orchardists that most commercial orchards are provided with sidetracks or spurs, where cars are set and loaded quickly and with the utmost economy, it follows that all orchards should be planted close to the commercial highways. It is even of decided advantage to locate the orchard near several railroads, as the competition as a rule provides better facilities, and the increased service offers more daily trains in reaching different markets.

In the coast countries and open prairie land of West Texas or Oklahoma, where heavy windstorms are of frequent occurrence and where natural forests are lacking for protection against these high winds, artificial windbreaks should be planted with bois d'arc hedges or catalpas. Cottonwood trees have proven undesirable for windbreaks.

APPLES.

PLANTING THE ORCHARD.

The distance apart of the apple trees in the orchard differs somewhat with the varieties; large standard kinds, like the Ben Davis, Winesap or



APPLES

Maidenblush, should be planted thirty feet apart, each way; smaller kinds like the June Red, Astrachan, Gano, American Queen or others may be planted twenty-five or twenty feet apart, each way. There is nothing

gained in crowding an orchard. On receipt of the trees from the nursery, trim the roots and top close and set the young trees naturally in holes dug about three feet in diameter.

BEST VARIETIES.

In planting an apple orchard either for home or commercial use, the main points are to plant such varieties which have proven indigenous to the Southern soils and climate, and also the kinds which ripen in succession, to afford a harvest of apples every summer and fall month.

For June harvest in the South, plant Early Harvest, Red Astrachan and Red June.

For July plant San Jacinto or Summer Queen.

For August plant Jonathan, Maidenblush and Bledsoe.

For September plant Twenty Ounce or Red Winter.

For October plant Winesap, Ben Davis, Arkansas Black, Gano, Texas Red or Arkansas.

CULTIVATION AND FERTILIZERS.

The first five years in the apple orchard should be mainly devoted to establishing the young orchard, to a sound and healthy growth. More attention should be paid to the growth of the trees than attempting to induce the bearing of fruits. The young trees should be trained by judicious trimming to assume symmetrical tops; the bodies should be protected against borers, rabbits and other varmits.

In the home orchard there can be no objection to growing corn, potatoes and other truck in the young orchard, provided the land is again enriched by humus and manures, to offset the drain of nutrition absorbed by the crops. If this is not done the orchard must suffer in consequence. On the opposite, in the commercial orchard no crops should be grown, to take away and impoverish the soil at the expense of the trees. Leguminous crops, like cow peas, velvet beans, etc., should be sown and turned under in the green state. It is often wonderful to what a high state of perfection an apple orchard may be brought by the above method.

Observation has taught us in the past that clean cultivation for the first five years is essential and will always be crowned with success. The new horticulture method of allowing a sod to grow in the orchard may be applied after years, when the trees have attained full growth, and even then it is only a question of time when the grass and sod will finally kill out the orchard.

HOW TO PICK APPLES.

Where farmers are not generally interested in the fruit business beyond what is necessary for home consumption, it is nevertheless just as

important that their apples should keep well through the winter. Much of this keeping quality depends on the way they are handled. Winter apples should not be shaken off the trees, but picked, and there is a knack in picking apples, as in everything else.

An apple should be picked off—not pulled off—and to do this requires a little knack. Placing the finger against the stem of the fruit and gently turning it backward, as it were, or, in varieties with short stems, simply turning the apple back or sidewise a little, will release it from the limb with the steam still attached to the apple, and not pulled out of it, as is often the case in average picking. It is quite essential to the appearance of the fruit, as well as its keeping quality, that the stem remain on the apple.

For packing apples for market read Part One of the book.

THINNING APPLES.

Thinning the fruit is a practice always advised and is exceedingly profitable. Some people think it does not pay, but there is hardly today a successful fruit grower in the country who does not thin his fruit, and this thinning is the key to his success over those who have favorable conditions but do not put out the first-class product. The fancy fruit and price is obtained by proper thinning. It makes fruit larger, of better color, reserves the vitality of the tree, destroys disease-infested and imperfect specimens and tends to cause the tree to produce an annual crop.

All the fruit must be picked sooner or later and many more apples will be worth picking if encouraged by thinning. An orchardist in Southern Oregon thins his apples to one on a spur, and the result is that 90 per cent of the entire crop sells in the three and one-half tier class. Determine then for yourself if it pays.

Always thin to one fruit on a spur and where the spurs are close all the fruit should be removed on a few of the spurs. The best apple of the cluster is the one to leave. The earlier the thinning the better, as the remaining fruit receives all the energy from the beginning of its growth. The thinning should be done when the fruit is about the size of a hazelnut. It sometimes requires more judgment and discrimination to thin fruit properly than it does to gather it. The cost of thining depends upon the cost of labor, and the condition of the trees. Usually the price will range from fifteen to eighty cents per tree.

Do not let your trees bear heavily while young, as every fruit they produce ruins the form of the tree. There is plenty of time for trees to bear after they have received the proper training and preparation for future usefulness. Some men boast of the wonderful yield of their two and three-year-old apple trees, but they do not realize what that means in the future.

APPLE TREE BORERS.

The pest of young trees will soon begin to deposit their eggs in crevices of bark and on sunburned branches and limbs. These eggs hatch in a few days and the young borer works its way into the bark of the tree. In a few days after this a small wet-spot can be seen on the bark, and by the presence of the wet spot the borers may be discovered and destroyed. It is a simple matter to cut out a small piece of bark and find the little white worm before it has reached the wood of the tree. A little attention to this during June and July is worth more to protect the trees from borers than all the tree paints that we have ever tested.

APPLE SCAB.

There is no fruit disease more familiar to the fruit grower than apple scab, sometimes called black spot. This disease is the result of a fungus growth which makes scabby spots on the fruit, and also attacks the leaves and newly-grown shoots.

Sometimes the infection spreads very rapidly, beginning early in the spring. It dwarfs the young leaves, many times kills the foliage, causing the fruit to shrivel, and in some instances the entire crop is ruined. Besides this, the disease works serious loss by dwarfing the apples that do mature. One statistician estimates that the loss in Missouri alone from this disease is nearly $500,000 per year.

It has been found that three applications of Bordeaux-arsenical mixture gives the best results. The first application should be made just after blossoms fall, arsenic poison being used to destroy the coddling moth. The second should be made about two weeks later, and a third about two weeks after the second. Some advise the first application to be just before the leaf buds open, and the experience of a number of fruit growers in the Ozark regions shows that this is the better practice.

PEARS.

The many failures in pear culture in the extreme southern parts of the United States has had a tendency to deter many from entering pear culture. These failures are partially due to lack of the proper drainage and the proper varieties for the Southern fields. Pears will grow and do well in any soil where apples will grow, but pears, like the apple, will never grow and live and become of commercial value on flat prairie lands in the South. The land, to begin with, must be rolling. Gravelly hillsides are highly suitable for pear culture, and may be utilized for that purpose.

Pears like the Le Conte or Keiffer may be propagated by cuttings. Cut-

tings are made from pieces of limb about six inches long and stuck in the ground where the tree is to stand, or put out in the nursery row for one or two years and then set out in the orchard. Other varieties must be propagated by grafting or budding into a hardy pear stock. In the South the Le Conte has proven a favorite for the stock.

PLANTING.

Pear trees should be set out 20x20 or 30x30 for the large varieties, as the Keiffer and Le Conte. Free access of winds and sunshine conduces to the health of all pear trees and reduces the ravages of blight.

CULTIVATION.

Light crops of all kinds may be planted in the young pear orchard with profit, and even of benefit to the trees, and, aside from these crops, the cultivation should be clean for the first five years.

PEAR

The only varieties of pears which have proven successful in the Southern fruit garden are the Wilder, Bartlett, Garber, Anjou, Keiffer and Le Conte.

PEAR BLIGHT.

The presence of the blight may be recognized by the black, wilted leaves and twigs in the top of the tree. These dead twigs and leaves cling to the tree and the discoloration spreads rapidly over the older wood on the same branch. In many cases the twigs and leaves look as if they had been killed by fire. The disease is more noticeable on the young shoots and leaves than on the trunk and larger limbs. It works also most rapidly on the young shoots.

The only known remedy is to cut and burn all diseased wood. The branches should be cut several inches below the lowest dead bark. There are many supposed preventives and cures for the pear blight, but unfortunately these do not seem to do all that is claimed for them. Almost every year some man announces that a preventive for pear blight has been found. These announcements are not followed with the work that proves the value of the materials.

HOW TO RIPEN PEARS, AND OTHER HARD VARIETIES.

Pick them carefully and put in a cool place, not more than six inches deep, and cover over with sacks or a wagon sheet just as soon as seeds are fully black. If trees are not too full and fruit is well colored and good size, it will by this treatment develop a very good flavor for so coarse a pear, and sell readily for a good price. But where trees are allowed to bear too full, and the fruit only grows to half size, they can hardly be handled in a way to make them fairly eatable. After storing, they must be looked over frequently, and any of them showing signs of decay removed. In sections of country where rot prevails, as is the case to some extent with us here, the best way to get the most out of the crop in cash is to take off and dispose of them for preserving purposes, just as soon as seeds are black. After housed about ten days they begin to mellow and turn yellow, when they are ready to pack in either one-bushel boxes or one-half bushel baskets, and shipped to market.

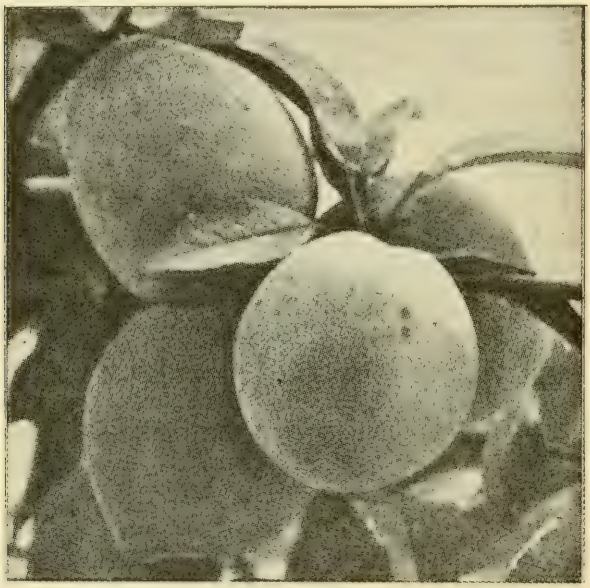
PEACHES.

The peach from a commercial standpoint is the most profitable of all fruits. It is one of the quickest of horticultural products to bring results, trees frequently coming into bearing the third and even the second year, and yet peach growing is attended with many mishaps, some of which may be guarded against and some over which we have no control. Conducive to failures is the wrong locality, improper soil, lack of drainage, planting diseased trees, the peach blight, peach borers, the yellows, and, last, late frost in the spring, which probably destroys more peaches than all the other causes together. In the South lack of snows, warm weather in January or early February, cause the sap to rise and buds to swell prematurely, and when these conditions are followed by extreme frosts the loss of an entire crop of an orchard or an entire State may follow, and yet one of the most prominent peach growers in the South, cultivating several thousands of acres, states if he can make three crops out of every five years he is satisfied. The average in the Southern States has never fallen below that estimate; in fact, Arkansas, Louisiana and Texas

have shown a better average in the last ten years, the most complete failure in Texas occurring in the spring of 1907.

The expense of planting and caring for a peach orchard is small as compared with many other fruits. Prices for trees are low, and the preparation of the land does not necessarily have to be as thorough as for many other fruits. The trees are easy to make live if first-class stock is planted.

In planting peaches, it must be borne in mind that it is of utmost im-



PEACHES.

portance that proper varieties are selected for the particular section in which they are to be grown. While a few varieties can be successfully grown over a more or less widely extended area, most varieties are limited in their range of adaptability.

Experience in the Southern States has shown that the Persian strain of peaches, so much grown in the Northern States, are unfit and unpopular for Southern culture. The strain of Northern Chinese, which includes Elbertas and many other fine varieties, is more suited to what we term the Cotton Belt. Also Spanish types of peaches, which include many native kinds that have originated in Georgia, Florida and the Gulf Coast, are next to Northern Chinese more preferable, as both the Honey peach and Pinto owe their origin to that stock.

SELECTION OF PEACH ORCHARD.

In selecting a suitable locality for a peach orchard the main points are a light, mellow soil, underlaid with a porous clay or fine gravel, subject to absolute and free drainage. Therefore light slopes are always preferable. To plant a peach orchard on heavy, level, prairie land is too hazardous, as one semi-tropical heavy rain, which is liable to occur during the hottest part of the summer, in July or August, may destroy a whole orchard by scalding the roots.

PLANTING.

Peaches should be planted eighteen feet each way, requiring 135 trees to the acre.

Fall and early winter planting always give the best results. Dig the holes from two to three feet deep, filling in with top soil. Cut off all broken and bruised roots—slanting cut from the under side. Set the trees two inches deeper than in nursery, slanting at an angle of 40 degrees to the southwest, or in direction of the 2 o'clock sun, the prevailing wind being from this direction. Trees set out this way and headed low, the top protects the body from the hot rays of the afternoon sun during summer.

Clean cultivation should be given from the start by frequent and shallow stirring of the soil, maintaining a loose dirt mulch under each tree. Some hoed crop may be grown between the rows during the first two years. The land should then be given up to the trees, unless a cover crop is desirable, which should be rye for winter and cow peas for summer, plowing each under at the proper season. A liberal supply of barnyard and commercial fertilizer should be applied broadcast. During the winter from one-fourth to one-half the year's growth should be cut back and an effort made to form a low, round, symmetrical head. All dead limbs and those rubbing each other should be removed. When the peach seed has hardened, thin the fruit on the tree. A temporary packing shed should be erected near the orchard, with a table running through the center. Near one end of this table should be a small canning outfit, with which all over-ripe fruit should be put up for the local market. Neat, attractive crates must be used and nothing packed but sound fruit, uniform in size and color, with the grower's name stamped on the crate.

The net profits range all the way from 25 cents to $4 per tree. Much depends on the variety, and general intelligence of the grower. It behooves the grower to keep abreast of the times by reading several fruit journals, cultivating the mind as well as the soil.

VARIETIES TO PLANT IN THE SOUTH FOR SUCCESSION.

Either for the home orchard, for family use, or commercial purpose, a

peach orchard should be planted with the view of harvesting peaches all through the summer and fall months, from May to November. Aside from the continuous profits from the orchard, it also lessens the risk of complete loss by late frosts, as all varieties seldom bloom all at one time.

For May harvest plant the Alexander, Bidwells Early, the Sneed, Waldo, Dewey or Texas King.

For June harvest plant Climax, Bidwells Late, Imperial, Triana and Angel.

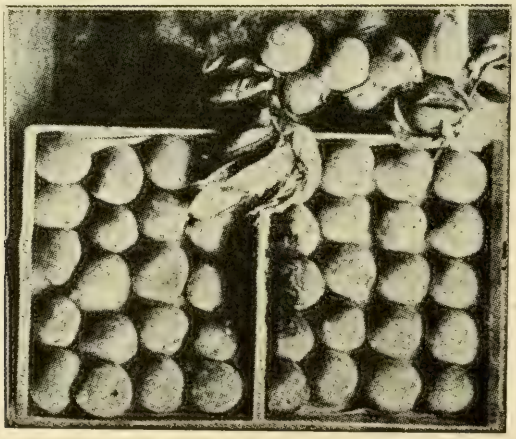
For July and August harvest plant Elberta, Stump, Chinese Cling, Florida, Crawfords Late, Thurber and Countess.

For September and October harvest plant Henrietta, Estella, Gibbons October, Victoria, Barnes or Everbearing, from early to late.

For picking, packing and shipping peaches see Part One of the Modern Guide.

APRICOTS.

Apricots are strains of the peach, more diminutive in size and of peculiar, pleasing flavor. The most of the apricots on the American market are grown in California. Of late years the semi-arid West, as Colorado, New Mexico and Arizona, is producing fine specimens of apricots. The



APRICOTS

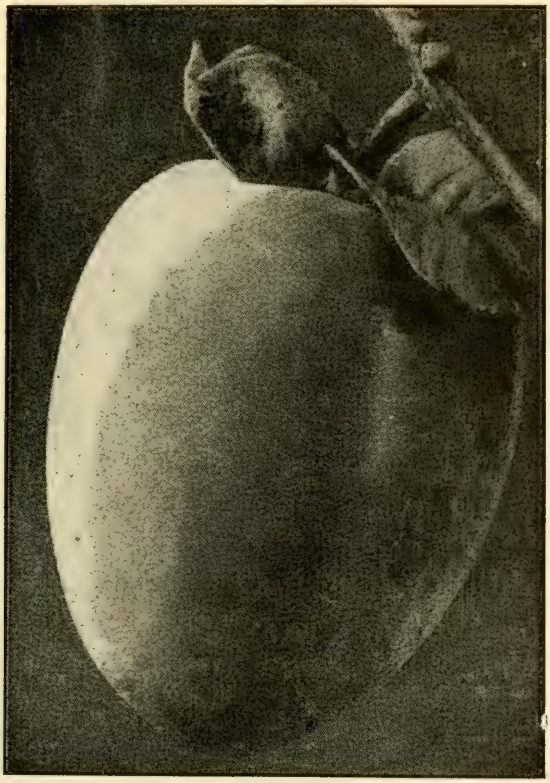
trees, being of smaller size, may be planted fifteen feet apart each way. With the exception of this distance apart, the planting and cultivation of the apricot is similar to peach culture.

Apricot trees being tender, are more liable to casualties from late frosts and insects, and have not proven very profitable so far in the South and

should not be planted to any extent in the Cotton Belt. Favorite varieties are the Early Golden, Moorpark and the Royal Apricot.

PLUMS.

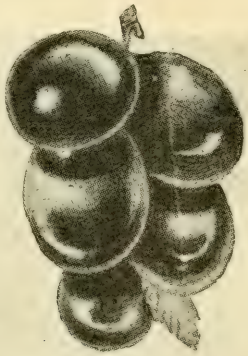
Plums are very profitable fruit crops, as the chances by casualties are considerably less than any other fruits. Very seldom a plum crop is an



PLUM

entire failure. The trees are hardy, vigorous growers, and adjust themselves to most any soil, climate and even the poorest surroundings. Quite frequently we meet the sight of a plum tree loaded with luscious fruit, where most any other fruit tree would perish. Black land, heavy clay soils, sandy land, rocky hillsides are all acceptable to the plum. Its worst enemies are late frosts and the curculio, an insect which without proper precautions may destroy an entire crop. For the remedy and spraying the curculio see Part Four of this book.

In the orchard plum trees may be set fifteen feet apart each way. Clean cultivation the first few years and the application of manures is recommendable. Plums are always in demand in the ripe state, and for preserving the plum tree deserves a prominent place on the home farm and in the commercial orchard.



PLUMS

VARIETIES.

The Japanese kinds, such as the Gonzales, Abundance, Burbank, Satsuma, and the Burford Hybrid are the most popular and profitable.

For American types plant the Milton, Clifford, Wayland, America and Wards Red.

PERSIMMONS.

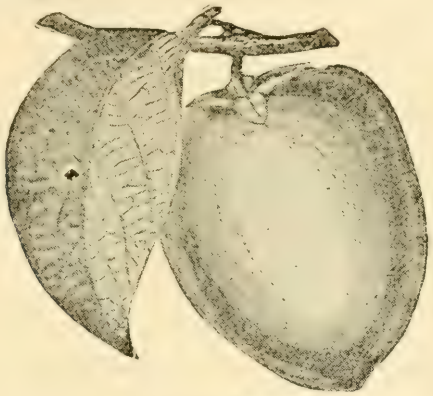
The cultivation of the persimmon tree in the United States is rather limited, but steadily on the increase, as the showy, sweet and remarkable Japanese varieties are better known. The Japanese have for centuries made the growing of persimmons almost a specialty. Every year several new varieties are imported to this country. As far as flavor is concerned, they are about all alike to us, and we have never seen any persimmon that would beat the genuine old native, frost-covered home persimmon in the late fall.

JAPAN PERSIMMONS.

Persimmons are easily grown, have few enemies and are prolific bearers. The fruit stands shipment well, is large, strikingly handsome and to most palates very delicious. When properly handled, properly marketed, displayed on fruit-stands at just the right stage of ripeness, its exceptional beauty and unusual flavor command good, in fact often fancy, prices.

Some of the varieties have dark flesh, others light flesh, still others

a mixture of the two. The light and the dark flesh differ radically in texture and consistency, as well as appearance, and, when found in the same fruit, are never blended, but always distinct. The dark flesh is never astringent; the light flesh is astringent until it softens. The dark-fleshed



PERSIMMON

fruit is crisp and meaty like an apple, and is edible before it matures. Some of the entirely dark-fleshed kinds improve as they soften. The light-fleshed kinds, and those with mixed light and dark flesh, are very delicious when they reach the custard-like consistency of full ripeness. In some, the astringency disappears as the fruit begins to soften; in others, it persists until the fruit is fully ripe. Seeds accompany the dark flesh. Light-fleshed kinds are seedless. Those with mixed flesh have seeds in proportion to the quantiy of dark flesh. Time of ripening, August to December.

The Japan persimmon tree being a dwarf, may be set quite close together in the orchard, from ten to twelve feet apart each way. They are also peculiarly adapted to our Southern climate and will grow anywhere any other fruit prospers. A light, porous soil, moderately rich or stimulated by fertilizers, will show some astonishing results in the growth of the trees and abundance of fruit. It is quite usual to see small trees bend to the ground, loaded with large, heavy fruit. Considering the size of the trees and fruit, the combination appears abnormal. The wood is exceedingly tough and the limbs often seek rest on the ground before relinquishing or ripening their fruit. The trees are highly ornamental and should find a place in the home orchard, as well as the commercial orchard, by all who admire a beautiful tree and delicious fruit.

VARIETIES.

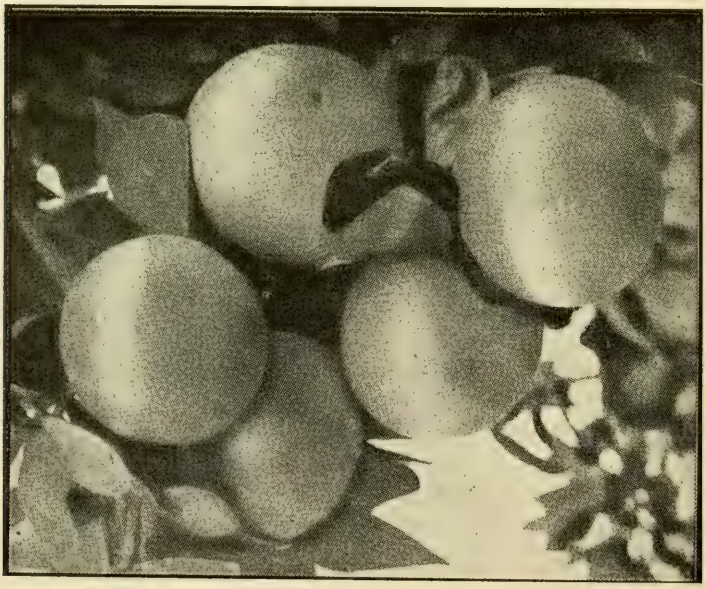
Among the native kinds the American Honey persimmon is the standard. This variety and all the Japanese varieties may be budded or grafted into the native wild stock. Any one having a natural growth of young persimmon trees may convert them into any of the improved kinds; in fact, the native roots are preferable. For this process of budding and grafting read Part Four of this book.

PICKING.

Like the hard pears, persimmons will ripen best if packed while quite hard and laid away in straw cellars or root houses. The persimmons will ripen so slowly there is amply opportunity to place them on the market in the right stage for consumption, and in that state they are always salable at remunerative prices.

ORANGES.

The culture of citrus fruits like oranges, grapefruit and lemons, with the



ORANGES

exception in South Florida and California, has been attended with such disastrous results in the more northern part of the South, that the new Southern investor, seeking remunerative ventures, is apt to look with sus-

picion at citrus culture, and yet man was made to overcome difficulties, and the horticulturists of our country have kept pace with other industries, and they will, no doubt, finally give us orange trees which may grow and prosper in a large portion of the South. In Japan, where the climate is similar to our Southern climate, many oranges are grown, but they are of a hardier stock, and these trees may form a basis from which suitable orange trees may be propagated for the South. In many parts of Louisiana, Texas and other coast countries, quite a number of orchards have succeeded, planted in a Japanese variety, called the Satsuma. As our aim in writing this book, *The Modern Guide,* is to recommend or describe only such fruits or vegetables where success is possible and not problematical, we will not, in this article on orange culture, devote any space to such tender varieties of oranges, lemons or grapefruits which in our latitude failures would be the rule, and success the exception; even the culture of the Japanese varieties will always be attended with some risk, and care must be bestowed in the selection of protected localities, low crowned trees, and low budding into a hardy stock like the citrus trifoliata practised, to insure success.

SATSUMA ORANGES.

The Satsuma orange is the hardiest orange tree known, up to this time, and the only kind that can be recommended for extreme southern planting for commercial or ornamental purposes. The Satsuma orange is of medium size, flattened, loosely adhering rind and easily separated segments, like all other varieties of the Mandarin group; the color is not red like the Mandarin, but of a deeper yellow than the Mandarin; flesh fine grained, tender, juicy, sweet and delicious, entirely seedless, ripen in September, October and November; on account of its extreme earliness, good appearance and excellent quality, it brings the highest prices in the markets. The tree is of considerably smaller growth than other orange trees. This is rather an advantage than a detriment, being a protection against cold; entirely thornless, and bears very young, often on the second year's wood.

A Satsuma orange grove should only be planted where there is some protection against the cold northern winds by timber, hedges, barns or houses; water protection near lakes or streams is also very desirable. As the fruit is seedless, the trees must be propagated by budding.

SOIL AND FERTILIZERS.

The soil should be loose and containing humus, something like a rich garden soil. The tree quickly responds and makes a rapid growth with fer-

tilizer containing a fair proportion of potash or phosphate of bone. As the trees are really drawfs, they may be set quite close together, about twelve feet apart each way.

BUDDING.

Citrus trifoliata, a species of the citrus family, bearing a small, non-eatable orange, is the hardiest stock, as far as withstanding cold is concerned, and offers an admirable stock for the budding of the Satsuma orange. Most nurserymen sell Satsuma orange trees budded on the trifoliata stock, and when time is an object one or two-year-old budded trees may be bought at reasonable prices; the main point is to see that the Satsuma bud is inserted low in the stock, not over twelve inches from the ground; the advantage of this is, in extreme cold weather the trunk of the tree may be wrapped higher than the union of the woods, and even should the entire top part of the tree be killed, as long as some of the Satsuma wood is left uninjured, the trees would soon recuperate and bear fruit again the second year following.

Where it is desirable to grow the trees, sow trifoliata seed in the nursery row, and when the trifoliata stock is two years old, bud the stock with Satsuma buds about eight inches from the ground. For budding, see part III. of this book.

Every lover of trees should at least plant a few of these most beautiful Satsuma oranges on the home farm, orchard or door yards. The sight of the loaded small trees, with the golden oranges, is most pleasing and enchanting.

FIG CULTURE.

HOW TO PLANT, PACK AND SHIP FIGS.

For many years the Southern farmer has cultivated figs in a limited way around door yards; in fact, many growers believe that figs cannot be successfully grown in orchards. As an old farmer remarked to us, "The fig tree has got to smell your breath to do well." This, however, is all erroneous. Figs are now successfully grown in large orchards inMississippi, Louisiana and Texas, with good results. The fig tree is a ravenous feeder, and delights more in liberal application of all kinds of manures than frequent cultivation; in fact, deep cultivation around the trees is rather more harmful than good. The demand for figs is steadily increasing, as the fruit is gradually introduced in Northern markets; its peculiar sweetness and laxative properties make it a healthy, desirable fruit to all who once have acquired a taste for figs.

Besides being a delightful fruit in its ripe stage, it is peculiarly adapted for preserving, and there is hardly any preserve higher in price or more in demand than preserved figs, when properly treated.

PLANTING.

Figs do best on sandy, well drained loam; the figs can be easily and cheaply propagated from cuttings, and it is not unusual to see cuttings planted in the spring mature figs in a limited way the same year. Fig cuttings, or trees, should be planted fifteen feet apart each way, or they may be planted in rows fifteen feet apart and eight feet in the row; it is not a bad idea to plant figs along fences, outhouses, barns and chicken yards. Chickens do well under fig trees, and so do the trees, in consequence.

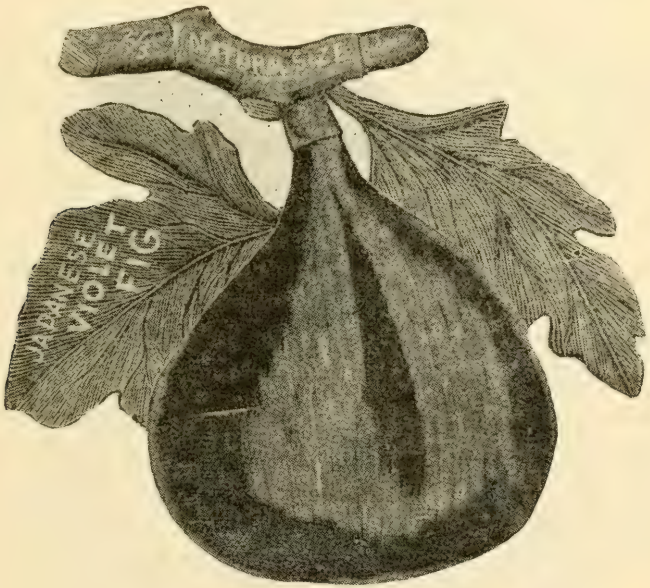


FIG.

VARIETIES.

There are many excellent varieties, such as:

Celeste or Sugar Fig, the best for all purposes.

White Adriatic, very large, juicy fruit, very thin skinned, good bearer.

Brown Turkey, medium size, color brown, very prolific.

Large Blue Ischia, dark blue, very large and of fine taste.

Lemon Fig, a peculiar lemon flavored fig.

In the Coast Country there is a local fig called the Magnolia Fig, which is very desirable on account of its size, sweetness and prolific bearing qualities. It can be procured from any Coast Country nursery or grower. Fig trees have been known to yield 1000 pounds of fruit to the tree in one season.

FERTILIZERS.

A heavy application of good, strong barnyard manure each year is desirable; even liquid manures are keenly appreciated by fig trees. Where barnyard manure is not available in sufficient quantities, we would advise to use monthly on small trees three pounds of fertilizer containing: nitrogen, 5 per cent; actual potash, 9 per cent; available phosphoric acid, 9 per cent for each tree.

CULTIVATION.

In a young orchard the cultivation should be frequent and very shallow, especially close to the tree. Other light crops may be grown between the rows. As the orchard grows larger very little, if any, cultivation is required, or just sufficient to keep down excessive weeds and grass and assist in applying fertilizers.

It is quite frequent that fig trees, during January, put on an early growth and a late freeze in February or March kills all of the tops. This is, however, not very serious, as the roots are seldom killed, and the figs, being such spontaneous growers, will re-establish themselves in short order, even bearing a good crop during the following summer.

PACKING AND SHIPPING.

During the ripening season, figs must be picked every day; as soon as one shows a large increased size and color, it must be picked and packed for the market. Figs should be carefully and nicely packed in strawberry boxes and in crates holding twenty-four of the quart boxes.

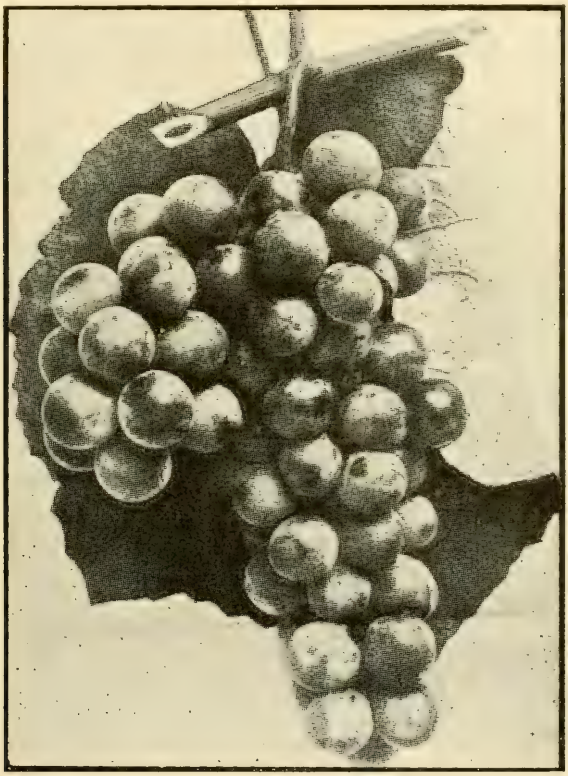
GRAPES.

The decade closing the first half of the last century witnessed the birth of commercial grape culture in the United States, leading up to the making of choice wines from American grapes.

In the United States there are two distinct grape producing sections, one east of the Rocky Mountains, where the American varieties are largely and pofitably grown; the other in California, where the Vinifera varieties have found a congenial home. These sections differ not only in their products, soils and climate, but also in their methods of pruning, culture, gathering, working and marketing of crops, so that only those familiar with both sections are able to make a just comparison.

Nearly all the varieties grown in California do not do well in our South. As to varieties of grapes to plant, each locality must in a measure determine this for itself, grape growing being perhaps more dependent on selection of varieties with reference to soil, climate, location and other conditions than any other fruit industry.

The writer has seen such radically different results with the same varieties planted in vineyards only a short distance apart, that it would



GRAPES

hardly seem possible they were the fruit from the same variety.

It must first be decided whether to grow raisin, table or wine grapes. Usually it will be well to select such varieties as have proven valuable for such purposes in your immediate vicinity. It is seldom that you will find more than ten or a dozen varieties that do well in any one locality. Now those that do best for us here in the Southwest are Lenoir (Black Spanish), Herbemont, Black July, Catawba, Brighton, Delaware,

Niagara, Triumph and Concord. The first four named are the best for wine. The Lenoir (Black Spanish) have blighted so bad for the past few years that we have about abandoned it. Nearly all of the grapes that are subject to blight here commence to show brown specks on them about the time the seeds are forming in the berry, and the best remedy that I have found is not to cultivate, stir or plow the ground for several weeks while the seed are forming and hardening.

Spraying the grapes with the Bordeaux mixture as soon as the brown specks appear is a preventive, if applied beforehand, and a remedy later. For the formula of the Bordeaux mixture and application, read Part IV. of this book.

SOIL.

The soil best adapted to grapes in any locality is a gently sloping, well drained sandy soil: even hillsides are good. Should there be gravel or small stones it is no detriment if the land is fertile; if it be poor, use such fertilizers as will supply those substances in which they are deficient. If the soil lacks in fruit producing qualities, potash is needed; if more wood growth is desired, nitrogenous fertilizers should be applied.

It may be of interest to some to know how we make cuttings and propagate vines. In the first place, we select the variety that we wish to propagate; cut or prune the old vines, leaving a spur with two or three buds on each spur, then take two vines, cut off and make our cuttings.

Cuttings should be about eight inches long and about the size of a lead pencil, with not less than three buds; cut the lower end close to and just below the joint; cut to the top end one inch above the joint. The proper time for pruning and making cuttings is December and January. Cuttings can be buried in the ground—say a foot deep, and kept until all danger of frost is past; then put them in the nursery four feet apart and six inches in drill, pressing the dirt to them well, only one bud being left above the top of the ground. In hoeing, care should be taken not to move the cutting, as it lessens the chance to take root. Generally about 80 per cent of our cuttings grow. In November they are ready to be put in the vineyard or for sale, as the case may be, or heal them in and set them out in vineyard in January or February, cutting off all the vine except the main stem, leaving it about two inches long. The first year we let them grow at will without pruning. That fall or winter we cut them off again, except the main stem, leaving it four inches.

Now the vineyard should be posted, and one wire stapled on 2 1-2 feet from the ground. In the spring all the shoots, which will be many, should be pulled or rubbed off except two of the strongest, and when they get eight or ten inches long the weaker one should be cut off and the

other one tied loosely to a small stake and trained up to the wire. When it reaches the wire pinch the bud out, then train the top laterals or suckers, one to the right and the other to the left, tying it to the wire, keeping all the suckers rubbed off from the wires to the ground. This forms what we call the arms. At pruning time those arms should be shortened or cut back, so that each arm will be about four feet long and tied securely to the wire. The next spring two wires should be put on the posts, the first or second one ten inches above the first and third fifteen inches above the second, the second wire being only ten inches from the first, which gives the young canes a chance to fasten their tendrils before they get so long and heavy that the wind will whip and break them, and save so much tying up. The top trellis holds up the long vines so that the grapes get plenty of air, and also acts as a shade from the hot rays of the noonday sun. Now in the spring, when these arms begin to put forth their upright canes that bear the fruit and cover the trellis, care should be taken to thin them to one cane to every six inches, never letting anything grow below the bottom trellis except the main vine. In pruning we always cut off all new wood except two or three inches next the old vine, which is called spur pruning. We have only touched on some points that we thought might be of interest to someone. There are so many different methods of pruning and training that the details of them cannot be discussed in this book.

In California two principal methods are practised, commonly called cane and spur pruning. All of the systems have one underlying principle. As the grape bears fruit mainly on the shoots on the wood of the previous year's growth, the pruning should be so as to renew the wood at a given point from year to year, thereby regulating its production and keep the plant thoroughly shaped and under constant control.

With a thorough knowledge of the nature of the vine nothing is easier than to prune it correctly. There are many who easily learn to prune fruit trees who fail to master the vine.

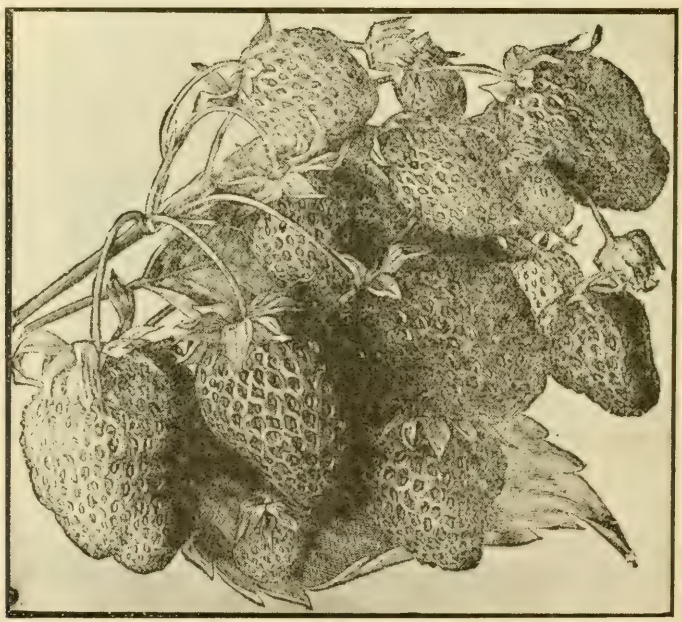
STRAWBERRIES.

Strawberries may justly be termed the queen of all small fruits, and in point of profits from the culture, strawberries are incomparable to all other fruits. Seldom an overstocked market on strawberries is found. The berry is so early and appreciated by all classes, that hundreds, even thousands of cars are annually shipped from the Southern States to Northern markets. The earliest berries arrive in the North in January and February from Florida, followed by Louisiana, Texas, South Carolina, Missis-

sippi, Georgia, Tennessee, Arkansas and Missouri, and the profits per acre are nearly the same. The proceeds at Alvin, Texas, last season, were over $400.00 per acre, and a thousand miles further north, in Van Buren, Arkansas, about the same. It will be seen by this that each locality has its season for marketing berries. Early or late the demand in the North is about the same. It follows that strawberries may be grown profitably in any latitude of the South. After once the ground is well prepared and the plants set, the cultivation, picking and packing are light, pleasant employments. Persons of delicate constitution seeking health by outdoor employment, could find no pleasanter and more profitable task than to grow strawberries for the market.

VARIETIES.

While most experienced strawberry growers in the South have favorite varieties, the best yet cultivated, and which have become standard, are, in the order named: Klondike, Newman, Excelsior, Mitchell and Lady



STRAWBERRIES

Thompson. The last named is rather pale of color, and not so desirable as the others, although it is a well shaped, hardy and prolific berry. There are many other excellent kinds, yet the above list is sufficient for the new beginner to pick a choice berry from.

PLANTING.

Strawberry plants may be set out in the South in any month of the year when the ground is sufficiently moist and warm enough. If the plants are set out in August or September, a light crop may be harvested from the plants the next spring, much depending on the thorough cultivation, and to have the plant vigorously established. The largest crops may be expected the second, third and fourth years. After the fourth year a decline will then follow, until the plants may become almost worthless. It is well then to plow up the strawberry patch and plant other crops on the land, planting the new patch on other land, where no berries have been recently grown.

In old strawberry fields root maggots and crown borers may appear, and rotation of all crops is always advisable as the only timely remedy for these pests.

Thorough preparation of the soil is a prime necessity. We lay off land thirty-two feet wide, plow three times, and thoroughly harrow same, turning soil to the center twice, the third time to the dead furrow, careful not to throw soil into the furrow, which is left for drainage. This will make a bed for ten rows of strawberry plants three feet apart. Now take a small plow, make a shallow furrow where the plants are to set. In this furrow distribute a fertilizer of about 6 per cent phosphate acid and 4 per cent nitrogen, at the rate of 300 pounds per acre. Then turning the plowing back on the fertilizer, making a slight ridge which is leveled somewhat by a plank, not too heavy, but that you can still see a slight ridge to plant on—it's always best to plant on a slight elevation—then you can cultivate closer to the young plant without covering same. When planting, which is done in the South from July to April, but for a crop of berries for next spring, probably September planting gives the best results, while plantings until latter part of November may make a half crop. Planting thereon into April from which no crop is expected, we set the plants three feet apart in the rows, letting the runners from these fill up the intermediate space to make single rows for next year's fruiting. Summer and fall planting we set the plants about ten inches apart in the row. Plants must be planted so as not to cover the crown of the plant—thoroughly wetting the roots when planting. If the roots by some cause become dry, better have them in water for twenty-four hours before planting, otherwise they will either die or make roots from the crown, to the serious injury of the plant. All plants ought to be firmly set, ground firmed with the foot, immediately after planting. Hoe and cultivate, keeping the ground well stirred and the runners removed. About the 25th of October another 500 pounds of the same formula of fertilizer per acre is

strewn along the plants and cultivated in, and some time next month running a sweep in center. This will in a measure bed the plants and leave middle lower for accumulation of excessive rain, keeping water from berries to some extent. In this way the plantation is left for winter mulching.

PICKING AND PACKING.

To make strawberry culture a profitable venture, the proper picking and packing are the most important items. The beds must be gone over every day and every berry picked that shows the slightest color. A small part of the stem should be left on each berry and the berry picked from the vine and not pulled off, as this injures both the berry and the vines. Usually the berries are picked in the field in the quarts and pints in which they are transported to market. This saves handling over, which is always more or less injurious to fruits of all kinds. The standard crates are the 24-quart or 24-pint crates.

Strawberries may be shipped by express without ice. When shipped in carlots, they must be shipped in refrigerator cars, well iced and re-iced in transit.

DEWBERRIES.

Dewberries are natives of the South, and will establish themselves promiscuously wherever land is broken, on right-of-ways of railways or country roads. Fire appears to be the only enemy of the dewberry in its native state.

Wherever dewberries are plentiful in the wild state, they may be picked and shipped in 24-quart crates the same as strawberries, and there would really be no need of planting dewberries, or bestowing any attention to cultivation, but dewberries, like all other berries, improve in size, flavor and sweetness, when transplanting in the orchard, and the culture of dewberries may be made a very profitable industry, when planted in rows, as they sell equally as well and at about the same price as strawberries, and a patch of dewberries once planted would last for years, without much further labor, and can be made a constant source of profit.

As dewberries will grow on most any kind of soil, they may be planted anywhere, where sufficient soil may be found to cover the roots. Sandy clay, stony or rocky land are all good for dewberries, and no fertilizers would be required, unless the crop is to be pushed, or of superior quality, which fertilizers always accomplish with any product.

PLANTING.

Plant the roots two feet apart in the rows, and the rows three feet apart, to admit of horse cultivation, which dewberries appreciate like other crops.

For picking and packing dewberries, see strawberries. There is an improved kind of dewberry called the Austin, which is considerably planted in the South, but we consider the native, when selected, as good as any dewberry.

BLACKBERRIES.

Blackberries, on account of their healthy and curative qualities, are a very favorite berry with many, and blackberry culture can be made profitable anywhere in the South.

Blackberries thrive on almost any soil, but the most desirable is a strong loam, retentive of moisture, tending toward clay rather than sand, but soil must be well drained at all times. Fertilizers containing a good pro-

BLACKBERRIES

portion of potash are the most desirable; too much humus or nitrogen will induce a rank growth of wood at the expense of the fruit.

The rows should be four to six feet apart and the plants from three

to four feet in the row, according to the character of the soil. If desired to cultivate both ways, set the plants in checks six to seven feet each way. As soon as the fruiting season is past remove the old canes; these should be burned at once. The young canes should be clipped off when they reach the height of about two feet; this will cause them to branch and they will become self-supporting. Apply fertilizer during the late winter and give shallow and constant cultivation.

The most favorite cultivated varieties are the Wilson's Early, Agawam, Mersereau and Erie.

Blackberries when ripe are exceedingly soft and tender, and can only be shipped with the greatest care to close by markets. Pack and ship in 24-quart strawberry crates, like the strawberry and dewberry.

PECANS.

PECANS FOR PROFIT.

The planting of pecan groves is not receiving the attention of fruit and truck growers in the South as it should. Every Southern fruit and truck

PECANS

grower, by planting ten acres of pecans, growing small fruit and truck between the rows of trees, can make a good living, provide for his family and old age.

Plant pecan trees on your truck land, 40 by 40 feet apart. This will give you 27 trees to the acre. On an average each tree at the end of ten years, will give you 75 pounds of nuts or 2,025 pounds total per acre. These nuts will sell at the lowest wholesale market price for soft shell pecans for 8 cents per pound. This gives you an income of $162.00 per acre, or a total of $1,620.00 for ten acres. As the trees begin to bear at 6 years of age, you will have already received full pay for the cost of trees and cultivation up to the ten years; this leaves you in possession of a pecan grove worth $10,000, as no sane man would sell an acre of ground for less than $1,000 per acre that yields an income of $162.00 each year. As the pecan trees will long outlive you, you are independent for life, and have a handsome property for your posterity.

The pecan is a hickory with thin shell and of finer quality than the hickory. It naturally belongs to the Southern States, and is better adapted to the lower Southern States. For the last few years it is commanding attention from planters of profitable fruit, and no fruit is growing in interest faster than the pecan. The pecan is the only fruit planted that will last a century. It is not a perishable fruit, and does not have to be gathered in a rush and shipped, or kept in expensive cold storage, like other fruit. Not restricted in its sale, it takes the world for its markets. It is the best eating of all nuts; most used of all nuts; most profitable of all nuts.

The whole tree is profitable. The wood is in demand at any age. The nuts are used for desert, for oil, for confectioneries, and is lately being used extensively for nut foods, which will furnish an unlimited demand for the nuts.

The pecan business is no new business. Texas alone furnishes one-half of all the pecans sold in the United States. Her annual crop is from 200 to 500 cars, at from $1,000.00 to $2,000.00 per car.

If you are the owner of good land, seize the opportunity and plant pecans. Talk pecans and let the Southern people raise them. The United States imports a greater and greater per cent of nuts annually. The importation for nuts in 1902 was $21,480,000.00, which was 10 per cent greater than in 1901.

People who never travel beyond the bounds of their own county will hold that "the business will soon be overdone." It is a very small per cent of the many million inhabitants of the United States who ever saw a pecan. Besides, the population of the United States will grow faster than the Southern States will grow the nuts.

What is universally supposed to be the greatest drawback to the business will keep it forever a safe investment, and that is, "they take so long

to bear." While in reality their time of bearing does not vary materially from that of apples and pears, this supposed (?) drawback keeps the pecan the most profitable of all fruits.

Let us divide prospective planters into three classes—young, middle-aged and old men.

Young men of means, the ones who could plant pecans at the greatest profit, will not generally plant, because returns appear too distant.

The middle-aged man will not plant because his means are used in raising and educating a family, or pushing all the capital he can command into his business.

The facts in the case are: A pecan grove begins to bear the day after planting, and bears an increasing amount each day. To explain: Any one spending $1,000.00 in planting a budded or grafted paper shell pecan grove will not take $1,100.00 for it the day after planting. When two years old an acre of well kept budded or grafted pecans is worth $100.00; when ten years old is worth $1,100.00 per acre.

A budded or grafted pecan grove is better than a life insurance policy, government bonds, or bank account. If a man leaves life-insurance it is too often loaned out and lost. It is better than bonds, because it yields more annually from the trees that will live a century. It is better than a bank account, because the principal (the grove) will not be spent or mortgaged.

LOCATION AND SOIL.

Below the Ohio river, where plenty of oak and hickory grow, plant pecans. In the absence of hickory, plant after large trees of any kind, if not too flat and too poorly drained. The Mississippi delta is without doubt the finest section in the United States. But all of us do not live in the delta, neither do we want to. Plant pecans on the richest well drained soil obtainable. Fertile soil with good, red clay cub-soil is fine for pecans. If your soil is not rich, do your best on improving it, if you desire best results. Pecan trees are not damaged by overflows after they are two years old, but are generally benefited.

PREPARATION.

A thoroughly prepared cotton or corn field is good preparation. Subsoiling the land for a few years is quite beneficial—helps the supply of moisture and deepens the soil. Dig holes three feet wide and three feet deep. Fill up the hole with good, top soil and well rotted manure (two bushels). In the absence of well rotted manure, use two or three pounds of standard guano. Be sure that it is thoroughly mixed with good top

soil. If not well mixed, use less quantity, or leave it out. The preparation is best done one month before planting, to allow fertilizers to get diffused in the soil, and to allow for settling.

DISTANCE TO PLANT.

Plant trees 60 by 60 feet in delta and similar soil. Poorer land 50 by 50.

NUMBER OF TREES.

Planting 60 by 60 feet gives 12 trees per acre; planting 40 by 40 feet gives 27 trees to the acre; planting 45 by 45 gives 21 trees per acre; planting 50 by 50 feet gives 17 trees per acre.

PLANTING THE PECAN.

In the well prepared hole, dig a hole to easily take the root of the tree. Trim off all bruised and broken roots. Cut off tap root about 10 inches from collar of tree. Plant tree straight and firmly in the hole as deep as it grew in the nursery. Hill up close around the tree to allow for settling.

CUTTING THE TAP ROOT.

It is no drawback to cut the tap root, but a great convenience, and often a benefit. Large bearing pecan trees in flat woods (wet soil) have been blown over by storms and had no tap root at all.

FERTILIZERS.

About three pounds of good fertilizer worked in the soil around each tree the second year after planting, and adding one pound extra each year is a moderate and safe application. Fertilizing and thoroughly cultivating proper crops is the best way to stimulate the trees.

CULTIVATION.

Thoroughly cultivate through growing season till branches meet. Then sod to Bermuda grass for cattle is a most excellent plan.

WHAT CROPS TO GROW.

Pinders, sweet and Irish potatoes, well fertilized, are the best crops, because they allow all sunshine and air. Next comes cotton. Velvet beans planted in rows and fertilized with potash and acid is excellent for building up the land. It will be necessary to cut the vines off of the trees only about three times during a season. If you plant corn in the grove, plow the land three times and plant the corn late—say in May. This will give the trees a strong start. Give distance around the trees with all crops. Run corn rows east and west.

AGE OF BEARING AND YIELD.

Budded and grafted paper shell pecan trees will commence bearing from 5 to 6 years after planting in orchard. At 9 to 10 years will yield 50 to 100 pounds to the tree. The best yields from large trees has been over ten barrels. Georgia soil produces early peaches, early melons and early vegetables, and also yields pecans earlier than other sections.

COST PER ACRE.

Owing to the great distance between pecan trees, an acre does not cost much more than peaches, apples and pears, and not as much as an acre of oranges.

PLANT WITH PEACHES.

Plant peaches between the pecan trees; an acre does not cost much more than when first set out and peaches will yield their fruit and be out of the way of the pecans.

PECAN BUDDING.

It is not so hard to learn how to convert your old worthless pecan, hickory and pignut trees into annual bearers of fine paper shell pecans, as many think. If the proprietor of a native grove thinks he is too old to learn such tricks, no doubt he has a son from 15 to 20 years old who would be glad to undertake the task. It would relieve the monotony of farm work, interest the lad, make him feel a deeper interest in the farm and be a great inducement for him to remain on it. The trees should be prepared from now on before March 1, so now is the time to go out and get you some fine wood from the top of some trees of the above variety, say about six to ten trees. The work will pay you, and perhaps the biggest pay you ever did get from the trees, and leave them in shape to bring you in good revenue every year, by a little care, attention and nominal expense.

To secure large healthy sprouts to bud on, the top should be cut off ten to twelve feet above the ground, unless overflow land, then above high water mark. A few small limbs can be left below the cutoff, provided none stick straight up, even at an angle of 45 degrees. If such limbs are left, the sap will go straight up these limbs, which will soon make the top and the sprouts will be starved. The object is to make a new top out of a new sprout, and grow a bud of a fine variety on it for the entire new top. Thus, in from three to eight years, owing to how long the tree has budded, you will have an entirely new tree of a different nature bearing your family pecans yearly instead of the Northern nuts you now occasionally get. Perhaps you may have a tree in your grove that bears

a fine nut that is good enough for you. If so, why not make them all bear this variety? It can be done, and make the work profitable in firewood while doing it. But too many put it off too late, until the season is over.

PEANUTS.

Peanuts as a forage crop for dairy purposes, hog or stock food, has no equal in the Southern States, when we consider the inexpensive cultivation and nutritious qualities of the nuts and foliage. Of late years peanuts have been converted into oil, breakfast foods, peanut candy, and many other commodities until the price of the nut has experienced a constant increase. With the increase of the demand, it is safe to assert that every farmer, fruit, truck and poultry raiser in the South, who has ever grown peanuts, will testify that peanuts are a most valuable crop.

VARIETIES.

In all probability the White Virginia and the Red Tennessee, so much used for roasting for human food, are the best known to the general public. The White Virginia nuts are grown almost exclusively in the light sandy soils of Virginia and North Carolina, and appear to reach perfection only in those States, the same as the Red Tennessee is almost confined to Tennessee and a limited area of country. Neither of these kinds can be recommended for general cultivation in other parts of the South.

Under these circumstances, it is quite fortunate that we have the Spanish peanut, which adapts itself to any part of the South, and is a most prolific, rich and succulent nut; and this kind we recommend to all growers as the most profitable.

SOIL.

The Spanish peanut will grow in most any soil. On account of planting, cultivation and harvesting, light soils are preferable. Land that would hardly make a half crop of corn will make a full crop of peanuts, and no fertilizer is required.

PLANTING AND CULTIVATION.

The Spanish peanut may be planted in the South from March to August; even after other crops, such as potatoes, cabbage, beans, cucumbers and other truck crops have been harvested, peanuts may be planted with entire success.

Plant and bed the land in rows 3 feet apart; open with a bull tongue plow, and drop the kernels to average a kernel about every ten inches in

the row. Cover with a light harrow or board. The nuts should be shelled when planting. The cultivation of peanuts after the plants are up consists mainly in horse cultivation between the rows, very little hoe cultivation being required. As soon as the tops attain any size, they will soon shade the ground and conquer any grass or weeds that may appear and interfere with the growth of the nuts.

HARVESTING.

Under ordinary conditions, fifty bushels of clean, hand-picked peanuts may be expected from one acre, selling at $1.00 per bushel, and also 3 tons of vines, equal as forage to the best hay crop known. When we consider that this crop may be grown as a side line, at a time in the heat of the summer when other crops are liable to burn out, it will be readily seen that peanuts are an inviting crop. The demand for the nuts is practically unlimited, and it is even better to grow the nuts in large quantities, so as to be able to ship and dispose of the crop in carloads. There are now special machines on the market for both harvesting and threshing Spanish peanuts which we advise to procure, when the crop is large enough to justify the cost. Where the crop is small and for home use, they may be plowed out and gathered by hand to cure. Hogs may also be turned in the field after the crop is gathered, with profitable results.

WALNUTS.

With the exception of California, the cultivation of walnuts as a source of profit is very limited in the United States; the slow growth of the trees and long waits for returns deters many from engaging in walnut culture. The cultivation of the walnut, both for nuts and timber, can be made a source of profit. Walnut timber and cedar are probably the most valuable of all timbers, and are fast disappearing from the American forests, and the planting of walnut and cedar should be encouraged.

The soil for walnuts should be well drained; any stiff or rocky soil is acceptable, therefore walnuts may be grown on the poorest stony hillsides, where other trees or crops may fail, and the trees in time would convert this useless land into the most valuable part of the farm.

VARIETIES.

Several Japanese varieties have been imported into this country with more or less success: the trees bear much earlier than the native kind;

are more dwarfed and highly ornamental, and should find a place on the farm and in the orchard.

The thin shelled English varieties are also favorites in California, and

WALNUTS

a few other parts of the country, and may be planted with success where immediate results are not the prime object.

VALUABLE HINTS FOR THE ORCHARD.

HOW TO SET FRUIT TREES.

First buy of a reliable nursery.

Get trees as soon as they are delivered.

Never let the roots be exposed to the sun or air for any length of time.

Prepare the land as well as you would for any other crop.

Dig holes 2 feet across and 18 inches deep, and then dig bottom deep as you can, using a pick. Get dirt where logs and brush have been burned.

Fill holes so the trees will be deep as they grow in the nursery.

Put earth from top of ground on first and the clay on top.

If the ground is in any way dry, water the trees.

Always press ground firmly around the roots.

Cut out all damaged roots caused in removing trees from the nursery.

Cut all roots off that have been broken, until the wood gets white.

The top of a two-year-old tree should be cut off about 12 or 15 inches above the fork.

One-year-old trees are to be cut according to height to be headed.

Trees should be cultivated as any other crop that needs thorough cultivation.

Never sow wheat or oats in the orchard, or any other crops of the same nature.

GROW FROM CUTTINGS.

The grape, quince, currant, gooseberry, rose, and a number of other trees and plants grow readily from cuttings, if properly managed. They often do as well if made in the spring, but the best time is fall; and the sooner they are taken off after the leaves drop the better. Cuttings are made of yearling wood—the growth of previous season.

They should be from 8 to 12 inches long, and should contain at least two buds, better if three or four. The upper cut is made two or three inches above the upper bud, and the lower cut close below the lower bud.

SUMMER PRUNING.

Summer pruning is very important, especially to old trees that are in a vigorous condition. Uusually the old tree does not have an oversupply of vitality, and while it may present a vigorous appearance it will not have enough vitality to mature a growth of leaves, new shoots, and develop the fruit. Since the new shoots will receive attention before the fruit, the fruit will suffer if a systematic pruning is not practised. Summer pruning should be begun the first week in June south of St. Louis. Then the presence of the young fruit can be told and every water shoot that does not possess fruit should be cut off. All weak shoots that are filling up the center of the tree should be removed, as should all those which are making a rapid and watery growth.

RENEW THE ORCHARD.

The best kind of renewal for the old orchard is not the so-called "pruning up method." In short, the tops of the trees should not be cut back, so they will branch out heavily near the ground. Cut out the topmost branches the first season of renewal, leaving only the healthy side limbs.

The next year these horizontal branches may have their extremities lopped back with the pruners in such a way as to promote a uniform, well-rounded, symmetrical head or top.

All wounds should be dressed a few weeks after cutting, with a thick paint made of pure white lead and a little boiled linseed oil.

The renewal of orchards may be profitably accompanied by the addition of stable manure, either worked into the soil beneath the extremities of the branches or allowed to remain on top of the ground as a cover for a few months. The manure should be well rotted, and should not be applied too near the trunk of the tree. If the soil is very rich, the application will be attended with more harm than good.

MAKING TREES BEAR.

To make trees bear when tardy coming into fruiting, in June, when sap is in the highest flow, take out strips of bark one to two inches wide, pointed at the ends, extending from near the ground to almost the branches. Always leave intact around entire trunk of tree, alternating strips of bark about the width of the strips taken off. New bark will form astonishingly quick without injury to the trees, yet a check will be given that will cause the formation of fruit buds. This plan is better than root pruning or girdling, the latter being dangerous.

It should be borne in mind, however, that if the fruit buds have been killed by frost or cold weather, no method of treatment will induce the formation of fruit.

GIRDLED TREES.

The reason trees die when girdled is because the hot, dry air comes in contact with the tender fiber under the bark. If this layer is kept moist and cool until it can heal over, no injury will result. If the girdling is near the ground, I hill the tree up with moist earth, entirely covering the wound. This I leave till the cut is entirely healed, when I remove it. If the snow was around the tree so that the pest made the girdle high up, I take mud and plaster the cut an inch thick, and then wrap this with a heavy cloth. During the spring and summer I dampen this bandage to keep the earth moist. As soon as the under tissues become hardened the bandage can be removed. I have followed this plan for several years, and have not lost a tree in that time.

The writer has found that simply spreading a thick layer of wet bran on the wound and then wrapping a heavy piece of cloth around this and keep-

ing the cloth wet by applying a little water once each day will prevent the tree's death. The layer of bran should be an inch or more thick, and should be replaced as rapidly as the water applied to the sack removes it.

MICE IN THE ORCHARD.

HOW THEY MAY BE KEPT FROM GIRDLING THE TREES.

Make a thick whitewash, about the consistency of cream, to which add enough blue vitriol to give a 'robin's egg blue' color. Pass between two rows, and apply with brush, coating that side of each row which is next to the operator.

Another remedy recommended is to make a poisonous solution, using one part of sulphate of strychnine, one-third of one part of borax, one part of white syrup, ten parts of water. This mixture is put into a large, wide-mouthed bottle and well shaken. Now cut fresh twigs from the kind of trees that are being attacked and with a small brush paint them lightly with the poison, especially the terminal buds. These are said to kill mice and rabbits without endangering birds and other animals. Scatter in runways frequented by the rodents.

Mice may also be killed with strychnine, powdered on corn meal mush. Wheat or corn may be soaked for 24 hours in a strychnine solution, made by boiling a teaspoonful of the crystals in two quarts of water, the grain, when dried, to be scattered at the bases of the trees.

FRUIT IN NOOKS AND CORNERS.

Of course, there is land enough on most farms without taking into account the nooks and corners, but to the thrifty farmer there is special satisfaction of raising crops where nothing grew before. Frequently by taking thought on the subject a farmer can manage to grow a large amount of fruit upon the unused spaces close by the farm buildings.

Two or three large cherry trees in the front yard will answer for shade, and will supply bushels of fruit. Pears, cherries and quinces can be grown without cultivation in the hen yard. Porches and piazzas upon the house can be utilized for grape vines, likewise the sunny side of the barn. Pear or cherry trees will flourish near a barnyard, and when planted there will gain strength from the use of neighboring fertility. Division fences and sunny back walls will do for grape vines. Large apple trees

planted close to the farm buildings will extend roots beneath them, and thus utilize the ground, and if the branches are not allowed to lie close to the roofs they will do no harm.

Pears seem to be one of the best fruits for the hen yard. They flourish in the rich soil without cultivation, and bear heavily. Apple trees also flourish, but much of the fruit falls upon the hard ground and is injured or left to be pecked by the fowls. Plums and peaches are nearly always short-lived in the highly nitrogenous soil of the hen yard. Cherries do pretty well, although the soil becomes a little too strong for them also, and cracked bark and tender, easily broken limbs are the result.

If cherries are grown in the poultry yard, the yard should be a large one, so that the ground will not become too rich for such fruit. Over-rich ground causes over-growth of tree and fruit, and decays very easily in damp weather. The yard should be large enough so that the grass is kept down, but not entirely killed out. Such conditions are better for trees and better for poultry. The same may be said of almost any other fruit in a poultry yard. No fruit tree can be very healthy, hardy and long-lived in a crowded poultry yard, but where a common sized flock has the run of an orchard, say one hundred hens to the acre or less, the result will be a benefit both to the trees and fowls.—American Cultivator.

HOW TO PACK APPLES.

Two layers of fruit should be placed in the bottom of the barrel, with stems down, and as close together as possible. These will form the facing, for this end will be the top when opened. Fill in with the same grade, shake often, and when near the top put in two more layers with stems up, letting the last layer stand a full inch above the chime of the barrell. Now put on lid, and slowly press into place, shaking the barrel meanwhile.

SPLENDID FRUIT RULES.

Do the picking on cool, clear days, and not on hot, murky days; don't pick when wet; never pick when wet; never pick while warm; try to do most of the picking in the morning, before the warm hours; ripen in a cool, dark place; keep the sun away from picked fruit; aim to keep it cool and keep it so; sort into grades and label each grade; don't try to market the "culls"; pick from the outside trees in an orchard first—the inside fruit is not so apt to be blown off by windstorms; use a spring wagon when hauling and drive slow; bruised fruit will soon be spoiled fruit; hang

the pail or basket so as to be able to pick with both hands; lay the fruit in, do not drop or throw them; when emptying picking basket pour the fruit gently; always pick fruit with stems on.

Do not destroy the ants you see ruunning up and down the trees; they do no harm and live off the lice.

On very rich soil peach trees often become top heavy. The only way to prevent this is to cut them back vigorously.

If you neglected to prune your grape vines in the fall, let them alone, as bleeding would be sure to follow cutting in the spring.

A tree that is half starved is an easy prey to insects, while a strong, well fed, healthy tree can resist to a large degree the effect of insect attacks.

Many orchardists declare that they prefer a rank growth of weeds in their orchards than a tough sod. Well, we don't favor either. A good cover crop is all right, but weeds and sod are of no value.

Rub the water sprouts off the centers of the trees and do not allow them to grow; they are unsightly and cause the rest of the tree to lose some of the nourishment that it should get, and which is only wasted when allowed to go into water sprouts.

Remember that a tree cannot move around in search of food, but that the food must be brought to it. If your ground is not rich enouugh to make the trees grow, then bring fertilizer and put near the tree.

Watch the young trees that you set out in the fall carefully, because they are tender, and perhaps the dirt is a little tight around the trunks. If it is, loosen it up a little, for if you don't the sap will not flow freely, and the tree will be dwarfed.

Remember the time has arrived when all fruit trees must be sprayed to insure maximum crops. For insecticides and spraying read part IV of this book.

PART IV.

SEEDS AND THEIR USES.

INSECTS, SPRAYING.

WORK FOR THE MONTH IN THE SOUTHERN GARDEN.

BUDDING AND GRAFTING.

SELECTING GOOD SEEDS.

The foundation stone of truck farming is the planting of absolutely pure and reliable seeds.

To buy seeds because they are offered cheap from doubtful houses must lead to loss and disappointment. The very fact that they are offered cheap creates sufficient ground for suspicion.

It is doubtful if there is a single product where deceptions are so much practiced as in seed selling, and the loss is never felt until the labor, fertilizer and season is lost forever.

As like begets like, nothing can be expected from degenerated seeds saved from culls or imperfect vegetables, which is so often done by irresponsible dealers. Seeds also mix and produce hybrids, which are as a rule worthless. Entire crops of cabbage and cauliflower are often lost on account of inferior seeds, and seeds should be purchased only from well established seed houses, which have some interest in selling only pedigreed seeds.

PLANTING SEEDS.

Most beginners in the truck garden sow seeds too thin. Experienced truck growers have long ago recognized the importance of having a good stand and would rather thin out than to replant. A half pound of cabbage seed may produce enough plants to plant an acre, but it can't be depended upon. It is safer to sow a pound and a half for the purpose. The cost of the seeds is nothing compared with the loss by the absence of plants when wanted. To get a good stand allow one for the blackbird, two for the crow, three for the insects and four to grow.

VITALITY OF SEEDS.

All vegetable seeds have their limit in vitality. Some retain life longer than others, depending upon the condition, and the climate in which the seeds are kept. Seeds should never be kept in air-tight receptacles, as seeds need air, the same as any other living matter. We give below a list, showing the life of seeds. If they are older they are worthless. Also seeds do not keep so well in the South as in the dryer atmosphere of the North, and it will not be safe to use older seeds in the South than the limits given.

Asparagus	2 years.	Cantaloupes	3 years.
Beans	1 year.	Watermelons	6 years.

Beets	3 years.	Okra	3 years.
Cabbage	3 years.	Onions	1 year.
Carrots	1 year.	Peas	1 year.
Cauliflower	2 years.	Parsley	2 years.
Celery	3 years.	Peppers	2 years.
Collard	4 years.	Pumpkins	5 years.
Corn (sweet)	2 years.	Spinach	1 year.
Cucumbers	4 years.	Squash	3 years.
Egg plant	5 years.	Turnips	2 years.
Lettuce	1 year.	Tobacco	4 years.

TESTING SEEDS.

Every truck grower should test his seeds before planting, because it will show what percentage are live seeds. This will enable him to plant seed, either thick or thin, so as to get a good stand; much loss of time and vexation can be saved by following our advice. It is an easy matter to test seeds thoroughly. Get a flat cigar box, fill the box two-thirds full of earth, pack down level; now get a piece of flannel or old blanket, cut the piece the size of the box, lay this flannel or blanket snugly on the dirt, water the whole and smooth down. Now, take a certain number of seeds and lay them out thinly over the surface, each one separate; take aonther piece of flannel the same size and lay over the seed, put on a light layer of soil and water again. Set this box in a warm place in the sun or under the stove in the winter and keep moist. In less than twenty-four hours many seeds, such as onion, turnips, etc., will show sprouts; for others, such as tomatoes and beets, it will take two or three days to show life. When ready to examine, after twenty-four hours, roll the flannel and dirt carefully to one end of the box, and you will see exactly what percentage you can depend on, and plant your seed accordingly; from 80 to 90 per cent should be a fair average; very small seeds may be placed on the flannel promiscuously, and on examination the looks of the young sprout will easily determine the vitality of the small seeds.

Every gardener who expects to make a success should test his seeds when received. Forewarned is forearmed.

SOAKING SEEDS BEFORE PLANTING.

While some gardeners soak the seeds before planting in order to gain

time, this practice cannot be recommended for general use, as often the seeds die after being placed in the ground. A much better way is to plant the seeds in the beds or fields where they are to germinate and soak them, by copiously watering the ground, after planting. Many seeds must be shaded during July and August from the midday sun, such as celery, cabbage and cauliflower, until hardy and strong enough to endure the excessive heat. When seeds, such as beans, cucumbers, melons and squash, are planted before it is warm enough, they are very apt to rot if it rains.

GERMINATING SEEDS.

1. Never sow out of time. Many of our truck farmers are in the habit of sowing too soon and in consequence are often compelled to sow double the quantity to get a good stand. As to the proper time for sowing, read our directions for planting.

2. Do not cover seeds too deep. It will be impossible for the finer varieties to push through, especially if the soil is heavy and claylike. The rule is never to cover seeds more than twice their thickness, except the finer ones, which require no covering at all They should be slightly pressed in the ground to prevent their being washed away.

Beans, peas and corn should be covered ¼ to ½ inch, according to the nature of the soil.

3. Keep your seed beds moist, but not too wet. Water in evening and during extremely dry weather twice a day, or oftener if required. Tender seeds, such as celery, onions, leek and cauliflower, may be shaded during the hottest part of the day. They have to be uncovered in the evening while the sun is still on the bed, well watered and left uncovered during the night. During cloudy weather no covering is needed, nor should they be covered when they are up, otherwise the young plants become too tender and damp off.

4. Previous to planting have your seed beds well prepared; have the soil well pulverized and mellow, but not too fine; otherwise a crust will form, owing to constant watering, on the surface, which prevents the tender germ from pushing through.

5. Never use fresh manure in the seed bed; if any is needed use well rotted horse, or in light sandy soil cow manure and incorporate it well with the soil before sowing the seed.

BEST VARIETIES OF VEGETABLE SEEDS FOR SOUTHERN PLANTING.

In giving this table below of the best varieties to plant in the Southern garden it must be understood that there is a constant change in garden seeds, old varieties being discarded and new varieties added every season. It is for this reason our new book, *The Modern Guide,* is most valuable, because it gives the names of the latest and most useful kinds and varieties, which have been tested, and for which there is a demand in the markets and are used for shipping purposes. The very best always heads the list.

Asparagus—Columbia White Mammoth, Conovers Colossal or Palmetto.

Beans—(Bush), Wardwell Kidney Wax, Golden Wax, Black Wax and Valentines.

Beans—(Pole), Southern Prolific, Flagelot, Lacy Wifes or Kentucky Wonder.

Beets—Red Egyptian Turnip, Half Long Blood or Red Turnip Beets.

Cabbage—(Fall planting), Late Flat Dutch, Late Drumhead, Baldhead, Autumn King and Succession.

Cabbage—(Spring planting), Charleston Wakefield, Early Flat Dutch, Early Drumhead and Winningstadt.

Carrots—Danvers, Intermediate, Half Long Luc and St. Valeric.

Celery—Golden Self-Bleaching, Pashal, White Plume and Large White Solid.

Cucumbers—New Orleans Market, Talby's Hybrid, the Klondike or Davis.

Corn—(Sweet), Adams Extra Early, Evergreen, Stowell's Sugar and Leming.

Egg-Plants—Large Purple, the New Orleans or New York Market.

Garlic—Italian.

Lettuce—Big Boston Market and French Market.

Cantaloupes—Rocky Ford, Burrell's Gem and Netted Nutmeg.

Watermelons—Alabama Sweet, Georgia Rattlesnake, Mountain Sweet and Kolb Gem.

Mustard—The Giant Southern Curled.

Okra—Early French Market or Lady Finger.

Onions—Bermuda White, Red and Crystal Wax, the Creole and Prize-taker.

Onion Sets—White Portugal, Yellow Dutch or Australian Brown.

Peas—(Bush), Philadelphia Extra Early or Alaska.

Peas—(Climbing), Marrowfat, English Champions.

Pepper—(Salad), Ruby King, Bull Nose or Bell.

Pepper—(Sauce or Drying), Tabasco, Chili Red or Mexican Chili.

Potatoes—(Irish), Triumph.

Potatoes—(Sweet), Jersey Sweet, Nansemond, Pumpkins, Yams, the Vineless, Sugar Yams and the Southern Red or Queen.

Pumpkins—Large Cheese, Field Pumpkins or Mammoth Tours.

Radishes—The Chartier, White Tipped, French Breakfast, Half Long Scarlet, Scarlet Globe and Chinese.

Turnips—Purple Top Globe, Purple Top Strapleaved and White Globe.

Rutabagas—Yellow Globe.

Spinach—Bloomsdale Savoy Curled.

Squash—Early White Patty Pan, Yellow Crookneck and Hubbard Squash.

Tomatoes—Livingston Favorite Beauty, the Stone, Dwarf Champion, Paragon and Acme.

Tobacco—Havana or Sumatra Seed.

TO PROTECT SEEDS AGAINST MICE AND INSECTS.

Stir a small quantity of pine or coal tar in the seeds, then add woodashes until every seed is covered with the mixture; plant immediately. Seeds will germinate more freely in the spring; for summer planting sow double the quantity.

SEED USUALLY SOWN UPON AN ACRE.

Barley, broadcast	1½ bu.	Onions, in drills	5 to 6 lbs.
Beans, pole, in hills	10 to 12 qts.	Onions, for sets, in drills	30 lbs.
Beets, in drills	5 to 6 lbs.	Parsnips, in drills	4 to 6 lbs.
Broom corn, in hills	8 to 10 qts.	Peas, in drills	1½ bu.
Buckwheat	1 bu.	Peas, broadcast	3 bu.
Cabbage, to transplant	¾ lb.	Potatoes, cut tubers	10 bu.
Carrots, in drills	3 to 4 lbs.	Pumpkins, in hills	4 to 6 bu.
Chinese sugar cane	12 qts.	Radish, in drills	8 to 10 lbs.
Corn, in hills	8 to 10 qts.	Rye, broadcast	1½ to 2 bu.
Corn, for soiling	3 bu.	Sage, in drills	8 to 10 bu.
Cucumbers, in hills	2 lbs.	Salsify, in drills	8 to 10 lbs.
Flax, broadcast	1½ bu.	Spinach, in drills	10 to 12 lbs.
Hemp	1½ bu.	Squash, bus. var., in hills	4 to 6 lbs.
Mustard, broadcast	½ lb.	Tomatoes to transplant	½ lb.

Melon, musk, in hills	2 to 3 lbs.
Melon, water, in hills	4 to 5 lbs.
Millet, broadcast	2 to 3 bu.
Oats, broadcast	2 to 3 bu.
Turnips, in drills	½ to 2 lbs.
Turnips, broadcast	3 to 4 lbs.
Vetches, broadcast	2 to 3 lbs.
Wheat	1½ to 2 bu.

STANDARD WEIGHT OF SEEDS.

Alfalfa Clover, per bu	60 lbs.
Alsike Clover	60 lbs.
Barley	48 lbs.
Beans	60 lbs.
Broom Corn	46 lbs.
Buckwheat	48 lbs.
Canary Seed	60 lbs.
Castor Beans	46 lbs.
Clover Seed, red	60 lbs.
Clover Seed, white	60 lbs.
Clover Seed, crimson	60 lbs.
Clover Seed, Japan	25 lbs.
Clover Seed, Burr, measured	8 lbs.
Corn, shelled, Adams	50 lbs.
Corn, shelled, Sugar	46 lbs.
Corn, shelled, Field	56 lbs.
Corn, on ear	70 lbs.
Flax Seed	56 lbs.
Grass Seed, English Rye	20 lbs.
Grass Seed, Italian Rye	20 lbs.
Grass Seed, Meadow Fescue	15 lbs.
Grass Seed, Orchard	14 lbs.
Grass Seed, Kentucky Blue	14 lbs.
Grass Seed, Timothy	45 lbs.
Grass Seed, Hungarian	48 lbs.
Grass Seed, Johnson	25 lbs.
Grass Seed, Meadow Oats	14 lbs.
Grass Seed, Rescue	14 lbs.
Hemp Seed	44 lbs.
Irish Potatoes, heaped meas	60 lbs.
Millet, German and Italian	50 lbs.
Mustard	58 lbs.
Oats	32 lbs.
Osage Orange	33 lbs.
Onions	54 lbs.
Onion Sets	32 lbs.
Peas, Cow	60 lbs.
Peas, English, smooth seed	60 lbs.
Peas, English, wrinkled	56 lbs.
Rape Seed	50 lbs.
Rye	56 lbs.
Radish Seed	50 lbs.
Sweet Potatoes	56 lbs.
Sorghum	50 lbs.
Sunflower, Russian	24 lbs.
Teosinthe	50 lbs.
Turnip	58 lbs.
Vetch	60 lbs.
Wheat	60 lbs.

APPROXIMATE TIME FOR CERTAIN VARIETIES OF SEEDS TO GERMINATE.

Asparagus	20 days.
Beans	8 days.
Mustard	6 days.
Okra	10 days.

Cabbage	8 days.	Onions	10 days.
Cauliflower	10 days.	Parsley	20 days.
Celery	14 days.	Peas	8 days.
Collards	10 days.	Pepper	10 days.
Corn	8 days.	Pumpkins	8 days.
Cucumbers	8 days.	Radish	4 days.
Egg plant	10 days.	Spinach	8 days.
Lettuce	4 days.	Tomatoes	10 days.
Watermelons	10 days.	Turnips	4 days.
Cantaloupes	8 days.	Tobacco	10 days.

SEEDS REQUIRED TO PRODUCE A GIVEN NUMBER OF PLANTS.

Cabbage, 1 ounce to 2000 plants.
Cauliflower, 1 ounce to 3000 plants.
Cucumbers, 1 ounce to 80 hills.
Egg plants, 1 ounce to 2000 plants.
Onion seed, 1 oz. to 200 feet drill.
Tomatoes, 1 ounce to 3000 plants.
Tobacco, 1 ounce to 5000 plants.

WORK FOR THE DIFFERENT MONTHS OF THE YEAR IN THE SOUTHERN ORCHARDS AND TRUCK FIELDS.

In giving explicit direction of what to plant and the proper time to plant, especially in the Southern vegetable garden, in each month of the year, it must be understood at the beginning that the Southern States represent a wide territory, averaging about 1,000 miles in length from the extreme Southern portion to the Northern lines, where the markets for early Southern fruits and vegetables starts. This vast territory comprises a climate from tropical, semi-tropical to the temperate zone, and as each zone has its respective season for either planting or harvesting its fruits and vegetables, it would be impossible to apply one set of directions to cover the proper period of planting with any degree of reliability for the entire South.

Below latitude 30° or Ish. of Suez, below Tampa in Florida or New Orleans in Louisiana, below Corpus Christi in Texas, where killing frosts seldom appear, tender varieties of vegetables, such as pepper, beans, cucumbers, squash, corn, egg-plants, melons and tomatoes may be planted in all of the fall and winter months, regardless of any specific directions;

above latitude 30° or Ish. of Suez, frosts occur regularly in certain months of the year, and all tender garden truck must be planted to conform as near as possible to visits of either early frosts in the fall or late frosts in the spring.

Experience about weather conditions, by long residence in the different parts of the South, is naturally the best teacher for the Southern truckers, but where experience is lacking, by the new beginners, our directions may prove of considerable advantage.

We admit that even our directions may avail but little on extraordinary occasions. Jack Frost is no respecter of persons or territory. He has been known to skip across the Gulf of Mexico and pay a visit to the Cuban planter; even to Mexico, among the banana, orange and sugar plantations.

We have seen the bay at Galveston, Texas, frozen over, with the mercury at 11° above zero, and again seen entire winters pass without the slightest frost at the very same place.

These unusual occurrences demonstrate the fact that all planting of tender vegetables, in any part of the South, is attended with certain risks at any time during the fall, winter and spring months. Fortunately the seeds cost but little, and the up-to-date Southern truck farmer is rarely intimidated by probabilities of frosts, and it is safer to plant and run the risk, and immediately plant again, should the crop be lost by frosts, as the ground is usually prepared and in condition to replant at once.

These uncertain conditions are really what makes the early vegetable valuable. If there were no destructive frosts either North or South, there would be no occasion to ship early vegetables to the Northern countries from the South.

The gradual season of planting and harvesting vegetables from the South to the North is well defined. Having given this subject much thought in the past decade, we found upon close investigation of data, that the distance of every ten miles from South to North makes the product one day or twenty-four hours earlier, and in 1,000 miles 100 days earlier. Allowance must be made for altitudes, light, warm soils, timber or water protections, proper moisture, heavy fertilizing, diligent cultivation, early maturing seeds and intelligent planting, which are all items that hasten any crop to maturity, the same as the lack of any of the items would retard the crop.

The directions we give in our book, *The Modern Guide,* for the planting of different fruits and vegetables in the South for different months apply only south of the line drawn below the center of latitude 35° Tripoli and latitude 30° Ish. of Suez; in plainer explanation, south of Charleston in South Carolina, south of Macon, Ga., south of Montgomery, Ala., south

of Jackson, Miss., south of Shreveport, La., and south of Waco, Texas. For points North and above this line, tender vegetables and fruits must be planted earlier in the fall to avoid early frosts, and later in the spring to avoid late frosts.

For directions for planting, cultivating, harvesting, packing and shipping the different fruits and vegetables, read Part II of this book.

JANUARY.

IN THE VEGETABLE GARDEN.

Spinach, mustard, carrots, beets, turnips and leeks may be sown, also early varieties of radishes.

Early varieties of turnips and rutabaga for table use can also be sown.

Sow lettuce, endive, cabbage and early cauliflower. As the weather is very unstable, it is best to sow in a frame and protect young plants during severe cold weather.

If the hotbed has not been prepared already during the previous month, it should be done at once, to sow now egg-plants, pepper and tomatoes; the latter can be sown a little later than the former.

Plant peas for general crop, such as black-eyed and large White Marrow-fat, Champion of England, Telephone and other varieties. Toward the end of this month the extra early varieties, like First and Best, Little Gem and Alaska, may be planted.

Divide and transplant shallots; also set out cabbage plants sown in November.

Onions, if not already transplanted, should be hurried now, so that they may have time to bulb. Those who desire to raise onion sets should sow the seed toward the end of this month, as onion sets which are set out early in the fall can be sold earlier than those raised from seed.

Cucumber seed can be planted now for forcing. It is best to plant the seeds in flower pots first, and when the third leaf is developed, transplant into the field.

IN THE FIELD.

Plant potatoes. The Bliss Triumph should not be planted before the latter part of this month.

Asparagus roots should be set out this month; also Texas Red Rust Proof Oats may be sown.

IN THE ORCHARD.

Fruit trees of all kinds, such as pear, plum, peach, apple and orange, as well as other varieties of fruit trees, should be planted.

Sow pecans now. This and the following may be considered the best months to set out fruit trees. Plant strawberry plants.

IN THE FLOWER GARDEN.

Continue to sow flower seeds during this month for spring and early summer blooming. The best varieties for now are Verbena, Phlox, Petunia, Summer Chrysanthemum, Lychnis, Flax, Scarlet Sage, Hollyhock, Sweet Alyssum, Aster, Columbine, Daisy, Wall Flower, Bell Flower, Sweet Sultan, Corcopsis, Sweet William, Japan and Carnation Pinks, Larkspur, California Poppy, Heliotropium, White and Red Everlasting Flowers. Candytuft, Lobelia, Monkey Flower, Love in a Mist, Evening Primrose, Sweet Mignonette. Set out rose bushes and flowering ornamental shrubs.

FEBRUARY.

IN THE VEGETABLE GARDEN.

All winter vegetables can be sown this month, such as spinach, mustard, carrots, beets, parsnips and leeks; also the early varieties of radishes, White Spring and Early Purple Top turnip. Lettuce, cabbage and early cauliflower may be sown.

Cauliflower and cabbage plants should be transplanted, shallots divided and set out again.

All varieties of peas can be planted in this month, especially the early varieties.

This is the proper month to sow asparagus seed, also to plant the roots of this vegetable, if not done so previously.

Hotbeds, on account of the changeable weather during this month, require a good deal of attention. Give air when the sun shines and the weather is pleasant, otherwise plants will become spindly and long-legged. If too thick, thin them out so that they may become sturdy.

You may begin to plant bush beans as soon as the weather permits; also cucumbers, squash and melons may be planted, as they often succeed if protected by small boxes covered with glass, as most gardeners do.

At the end of this month early corn can be planted. For market use, Adams' Extra Early.

IN THE FIELD.

February is the best month to plant a general crop of potatoes, as on an average they will succeed better if planted during this month than any other.

Mangel Wurzel and sugar beets should be sown this month for stock food. Sweet potatoes may be put in a bed for sprouting, so as to have early slips.

IN THE ORCHARD.

Plant fruit trees of all kinds, especially orange and pecan trees. Pecans may be sown during this month to raise trees from.

IN THE FLOWER GARDEN.

Sow flower seed for late spring and early summer, such as Zinnia, Balsams in frame, different varieties of Amaranthus.

Set out bushes and ornamental shrubs; sow Sweet Alyssum, Candy-tuft, Snapdragon, Pansy, Aster, Chinese and Japan Pinks, Daisies for late blooming, Lobelia, Reseda, Bottle Pink and Sweet Sultan. Phlox and Verbena may still be sown. Sow Sunflower, Sensitive Plant and Rosa Montana.

MARCH.

IN THE VEGETABLE GARDEN.

Sow beets, radishes and early varieties of cabbage, kohlrabi, lettuce, spinach, mustard, carrots, leeks, parsley, cabbage and lettuce.

Plant now all varieties of bush and pole beans; but for lima beans it is better to wait until the end of the month, as they rot easily when the ground is not warm enough or too wet.

Squash, cucumbers, melons and okra can be planted. Early varieties of peas may still be planted; set out tomatoes, egg-plants and peppers in the open ground and sow seed for later crop. Plant sweet corn.

IN THE FIELD.

At the end of the month sow sorghum, kaffir corn and milo maize for stock food.

Potatoes may still be planted, but all depends upon the season. Some years they do as well as those planted during the previous month. In fact we have seen the finest crop raised from potatoes which had been planted on the 15th of this month. Sweet potatoes can still be planted.

IN THE ORCHARD.

Fruit trees may be planted the early part of this month, or even later if the season is somewhat retarded.

IN THE FLOWER GARDEN.

Sow Balsam, Zinnia, Amaranthus, Torenia, Dahlia, Cockscomb, Cosmos, Portulacca, Browallia and Sunflower. Plant Gladiolus, Tube roses and Dalia bulbs. Set out Chrysanthemums for fall blooming.

APRIL.

IN THE VEGETABLE GARDEN.

In this month sow bush, pole and lima beans, sweet corn, cucumbers, squash, melons, cantaloupes and okra, beets, carrots, radishes, lettuce, mustrd and parsley. Sow tomatoes, egg-plants and peppers.

It is rather late to sow cabbage seed now, but if sown the early varieties may be successfully used.

IN THE FIELD.

Plant sweet potato slips for early crop, dig Irish potatoes planted early, and after well preparing the ground, plant corn, beans, squash, etc., in it.

Sow Cashaw and field pumpkins.

German millet should be sown this month. The ground ought to be well plowed and harrowed. Three pecks of seed is the quantity to be sown per acre. After sowing, roll the ground well and the seed will require no other covering. If no roller is handy, some brush tied together ought to be passed over the grown sown, and this will effectually cover the seed.

Every planter should give this forage plant a trial.

IN THE ORCHARD.

Little is to be done during this month, except perhaps, if the weather is favorable, budding orange trees on Trifoliata stools; keep young trees clean of weeds, and during a dry spell water those which were lately transplanted.

IN THE FLOWER GARDEN.

Sow Balsam, Zinnia, Portulacca, Gomphrena, Torenias and Amaranthus, Celosia. Plant Coleus and other foliage plants, Dahlias and Chrysanthemums, Sunflower, Gladiolus and Tuberose bulbs.

MAY.

IN THE VEGETABLE GARDEN.

During this month very few vegetables can be sown. Hardly any of the winter varieties if sown now will do well. The ground should be occupied by growing crops.

Where potatoes and onions were taken up, corn, melons, cucumbers, squash and pumpkins may be planted.

Yellow and white summer radishes and endive may be sown.

During the hot weather lettuce requires a good deal of water, as it will, if neglected, soon become hard and tasteless.

Large White Solid celery may be sown now, but must be well shaded, and if the weather is dry, should be regularly watered.

Late Italian cauliflower may be sown.

Lima or pole beans can be planted; the Southern Prolific is the best variety for late planting.

IN THE FIELD.

Cow peas can be planted now between the corn; or the Crowders in rows. The latter is the best to be use green. If cow peas are sown for fertilizing purposes, one bushel per acre should be used and plowed under when the ground is well covered with vines, or sometimes they are left until fall, when they commence to decay, and then plowed down. It is best, however, to plow them down when they have the most foliage, that is while they are blooming, as they then contain the most fertilizing properties. We consider cow peas the cheapest and most beneficial fertilizer for worn-out land.

Sweet potato slips can still be set out, taking advantage of an occasional rain; but if it does not rain they must be watered. As the tops of shallots get dry, which indicates their being ripe, they are fit to be taken up.

Pull them up and expose to the sun for a few days, and then store away in a dry, airy place, taking care not to lay them too thick, as they are liable to heat.

Sorghum can still be planted, and as it resists considerable drought, will do fairly well.

IN THE ORCHARD.

Besides budding, nothing can be done.

IN THE FLOWER GARDEN.

Follow instructions given for last month.

JUNE.

IN THE VEGETABLE GARDEN.

The sowing during this month is similar to the preceding; that is, not a great deal can be sown. The growing crops will require attention, as weeds grow fast now.

Corn may be planted for the last supply of roasting ears; also a few water and musk melons. Cucumbers, squash and pumpkins planted during this month generally do well; but if the weather is hot and dry, they require an abundance of water.

Southern Prolific pole beans are the best to plant this month, as they stand more heat than any other variety. Continue to set out sweet potato slips.

Sow yellow and white summer radishes.

To sow lettuce during the summer months requires a great deal of attention; in fact, it requires more care than most people are willing to bestow.

Before sowing, soak the seeds for half an hour in water, take them out, put in a piece of cloth and place in a cool spot under the cistern, or, if convenient, in an ice box. Keep the cloth moist, and in two or three days the seeds will sprout. Then sow them. It is best to do so in the evening, and give a good watering.

If the seeds are sown without being sprouted, ants will be likely to carry them away before they can germinate.

Should the weather be moist and cool in the fall it can be dispensed with.

Some late cabbage for winter crops may be sown in this month, as the plants are generally easier raised during this than the following months; but we consider this month too early for cabbage seeds, as the plants become too hard and long-legged before they can be transplanted.

Late Italian Giant cauliflower may still be sown at the early part of this month; toward the end Early Giant can be sown. Some cultivators transplant them, when large enough, at once from the seed bed into the open ground; others plant them first in flower pots, and transplant into the ground later. However, if transplanted at this time of the year they will have to be shaded for a few days and watered until they have taken a good hold.

Sow tomatoes for late crop toward the end of this month.

IN THE FIELD.

Cow peas for fertilizing purposes can still be sown. Plant sweet potato slips for a late crop.

IN THE ORCHARD.

Nothing can be done.

IN THE FLOWER GARDEN.

Follow instructions given for April.

JULY.

IN THE VEGETABLE GARDEN.

Toward the end of this month plant pole and bush beans. In the early part sow tomatoes for the last crop; also, some corn for roasting ears.

If the weather is favorable, corn may be planted also for stock food. Cucumbers can be planted for pickling; also Early Italian Giant cauliflower, lettuce, yellow and white summer radishes.

In new ground some turnips and rutabagas can be sown, but it is better to wait until next month, as they are apt to become hard and stringy.

After the 15th of this month, cabbage, Large Late Flat Dutch, Improved Drumhead, Crescent City Flat Dutch and Brunswick may be commenced with. The above are the leading kinds.

All cabbages require a strong, good soil, but the Brunswick and Flat Dutch in particular.

The ground should be well fertilized with either stable manure, cotton seed meal or superphosphate; but we consider cow peas planted on the cabbage land and plowed under the best and cheapest fertilizer.

The standard varieties, Superior Flat Dutch and Improved Drumhead, should be sown at the end of this month and during the next.

A large quantity of seed must be sown at this time of the year, as it is sometimes very difficult to get a proper stand, and it is always better to have some plants left over than to be short.

It is a very difficult matter to protect the young cabbage plants from the ravages of the insects, which are, especially after a mild winter, very plentiful.

Strong tobacco water or tobacco dust has been found very beneficial; also tobacco stems, cut fine and scattered over the ground, will keep them off to some extent.

In the field, orchard and flower garden nothing can be done this month.

AUGUST.

IN THE VEGETABLE GARDEN.

During this month gardeners in the South are very busy with sowing and planting. Bush beans, Extra Early and Washington peas can be planted; also continue to sow late cabbages, Drumhead Savoy. Sow Early Italian cauliflower at the early part of this month. This is the proper time to sow the Half Early Paris and other varieties.

Sow parsley and lettuce. It is best to cover parsley seed with moss or brush until it begins to come up.

Yellow turnip and White Strasburg radish may be sown during this month, and toward the end commence to sow the red varieties, such as Scarlet turnip, Half Long French and Long Scarlet, also Black Spanish.

Sow mustard and cress, all varieties of turnip and rutabaga.

If not too hot and dry, beets of all kinds may be put into the ground; but it is better to wait until the following month.

Carrots may be sown in the later part, if the weather is favorable; but if hot and dry, it is useless to do much, as seeds cannot come up well without being watered.

White Solid, Dwarf Large Ribbed and Perfection Hartwell celery should be sown now.

Set out shallots. Red and White Kidney beans for shelling should be planted at the early part of this month.

Set out tomato plants for late crop, if not done so last month.

If celery plants are set out during this month they require to be shaded.

IN THE FIELD.

Potatoes saved from the spring crop should ee planted early this month for a winter crop; the smallest potatoes are selected for that purpose and are planted whole.

IN THE ORCHARD.

If the weather is favorable orange trees may be transplanted during this month, and will generally do better than those transplanted in February.

IN THE FLOWER GARDEN.

Sow Balsam, Zinnia, Cockscomb, Gomphrena, etc., to bloom for November 1.

SEPTEMBER.

IN THE VEGETABLE GARDEN.

In the early part plant bush beans, as they will bear before frost sets in.

Also plant early varieties of peas, such as Extra Early, Early Alaska and Washington. All kinds of radishes, carrots, beets, parsley, lettuce, leeks, turnips, early cauliflower, kale, celery and mustard can be sown during this month.

Begin sowing Creole and Bermuda onion seed after the 15th of this month, as these are the most important crops and should not be neglected.

Transplant celery plants in ditches made for that purpose, and if the weather is favorable, set out cabbage and cauliflower plants.

If the weather is not too hot and dry, spinach may be sown, but has to be well watered, otherwise it is impossible to get a stand.

Some cabbage seed may be sown, but cabbage sown this month will generally not do as well as seed sown during the previous month.

Set out shallots, divide and transplant sorrel, sow turnip-rooted celery.

IN THE FIELD.

Continue to plant potatoes for an early winter crop. Use only small ones left over from a late spring crop, but do not cut them, as they are apt to rot. Plow under the cow peas and prepare land to set out cabbage and cauliflower plants.

IN THE ORCHARD.

Continue to bud if the weather is not too dry and the stools remain in sap.

IN THE FLOWER GARDEN.

During the month flower seeds, such as pansy, daisy, Sweet Alyssum, Candytuft, Stocks, Phlox, Chinese, Japan, Marguerite and Carnation pinks, asters, etc., can be sown. Plant hyacinth bulbs for early blooming at the end of the month. Sow on your lawn English rye grass for winter lawn.

OCTOBER.

IN THE VEGETABLE GARDEN.

Onion seed can be sown up to the 10th of this month, but it is better to get them into the ground as soon as possible, so that the plants get large enough before cold weather comes on.

Toward the end of this month, Black-eyed Marrowfat peas and English Windsor beans can be planted.

Sow cabbage, spinach, cauliflower, kale, mustard, carrots, beets, leeks, parsley, lettuce and radishes.

Shallots set out previously may be divided and set out again.

At the end of this month some of the celery which has been planted early may be earthed up. Water it frequently with soap water.

IN THE FIELD.

Rye, barley and Texas Red Rust Proof oats should be planted for stock foot; also orchard grass, red and white clover, alfalfa or Lucerne and Crimson clover. Sow Red Top, Kentucky Blue, Timothy and Rescue grass.

IN THE ORCHARD.

Spray your fruit trees in order to destroy scale and other insects, and prepare land to set out more trees. If the weather is good and the trees are in sap, bud orange trees on to sour stock, but not on Trifoliata.

Transplant strawberry plants; they have to be transplanted every other year, as they cannot be left in the same place for many years, as is done North.

IN THE FLOWER GARDEN.

Continue to sow flower seeds of all spring blooming varieties. Plant hyacinth, narcissus, tulip and lily bulbs, pansies, daises, Sweet Alyssum, Candytuft, Petunias, Phlox, Verbenas, Columbine, Chinese, Japanese and Carnation pinks, Snapdragon, Sweet William, Stocks and poppy..

NOVEMBER.

IN THE VEGETABLE GARDEN.

During this month continue to sow all varieties of winter vegetables as during the previous month.

Superior Large Late Flat Dutch and Improved Drumhead cabbage sown in this month will make fine heads in the spring, also other late and second early varieties.

Sow Black-eyed Marrowfat and other late varieties of peas; they are not easily affected by frost as long as they are small, and during this time of the year they will not grow very fast. English Windsor beans may be still planted; they are hardy enough not to be hurt by frost.

Hotbeds should be gotten ready now for cucumbers; manure for same should be looked after; it ought not to be over one month old.

Throw it together in a heap, and when heated fork it over agin so the long and short manure will be well mixed.

The first vegetables generally sown in hotbeds are cucumbers. It is best to start them in two or three-inch pots, and when they have two rough leaves, transplant them into their place. Two good plants are sufficient under one sash.

IN THE FIELD.

Continue to sow Texas Red Rust Proof oats, rye, wheat, barley, all varieties of grass seed, red, white and crimson clover and alfalfa. Set out cabbage and cauliflower plants and work those set out during the previous month.

IN THE ORCHARD.

Prepare your land to set out fruit trees, transplant those which are dormant, and set out strawberry plants.

IN THE FLOWER GARDEN.

Sow flower seeds of all kinds in boxes and transplant when large enough into open ground, such as pansy, daisy, Phlox, Petunia, Chinese and other pinks, Alyssum, Candytuft, wall flower, larkspur, Lobelia, Nierembergia and poppy.

Set out rose bushes and other hardy plants.

Plant hyacinths, tulips, narcissus, jonquils, Anemones and Ranunculus in open ground or flower pots for forcing.

DECEMBER.

IN THE VEGETABLE GARDEN.

During this month not a great deal is planted, as the ground is generally occupied by growing crops.

Pease for general crop may be planted; some potatoes could be risked, but on account of cold weather during January and February, it is very uncertain whether they will succeed or not.

Spinach, radishes, carrots, lettuce and some early cabbage may be sown.

Sow early varieties of cauliflower, such as Early Erfurt, Half Early and Extra Early. Of early cabbage, sow Early and Large York, Oxheart and Winningstadt.

Sow tomatoes for forcing in a cooled-off hotbed, the best kinds for that purpose being the Extra Early Dwarf and Dwarf Champion. The former is really a good acquisition; it is very productive and of good size, and bears the fruit in clusters.

These varieties will only sell for the first crop, as the fruit is not as large as the Livingston varieties, which come in later.

IN THE FIELD.

Sow alfalfa, red, white and crimson clover, all varieties of grass seed, rye, barley, wheat and oats for stock food, which, if the weather is favorable, will do well.

IN THE ORCHARD.

Prepare ground for fruit trees during this month, and toward the end begin to plant some.

Sow pecans to raise trees from.

Prune, work and fertilize trees which have been planted during the previous season.

IN THE FLOWER GARDEN.

Plant hyacinths, tulips and Japan lilies. Sow all varieties of winter and spring blooming flower seeds in cold frames to be set out in January and February, as, for instance, Lobelia, asters, pansy, daisy, Phlox, Petunia, Chinese and other pinks, Alyssum, Candytuft, wall flower, Larkspur, Nierembergia, poppy, hollyhock, Snapdragon, Flos Adonis, Calleopsis, heliotrope, Primula and Reseda. Set out roses and other hardy plants. Plant English rye grass for your winter lawn.

A FEW REMARKS ON RAISING VEGETABLES FOR SHIPPING.

Truck farming or the raising of vegetables for shipping to the Northern and Western markets is a very important and growing industry.

With better facilities for placing our truck on the markets, a greater knowledge acquired by past experience, of the best methods of packing, etc., and the natural advantages of our climate, this business can be made a very profitable one.

Almost every kind of vegetable is shipped from here, but beans, cucumbers, beets, tomatoes, cabbage and peas form the bulk of shipment. For beans, the Dwarf Wax, Improved Valentine, "Best of All," and Extra Early Refugee are principally planted for shipping purposes; the last two carry well and find ready sale. The wax varieties do well in a dry season, but in a wet one they are very apt to spot, which makes them unfit for shipping. The Wardwell's Kidney Wax and Dwarf Flageolet have the preference among the dwarf sorts. The Golden Cluster Wax Pole is the best kind and follows the dwarf varieties in close succession. If they have had a good season to grow, so they arrive in good order at destination, they will sell higher than any other variety. The "Crease Back"—a green

podded pole bean introduced here by the late Richard Frotscher—is well adapted for shipping. It is very early and will follow the dwarf beans closely in maturing. Thousands of bushels of green pods are shipped from New Orleans to Western markets. They are generally stenciled "Mobile Beans," which name is wrongly applied. Very few of the variety are planted at that place.

In the way of cucumbers, the Long Green and New Orleans Market are the best varieties, as they bear abundantly, keep their color better, and are superior for shipping to any other. We have been supplying the largest growers in this vicinity in that line with seed, the stock of which cannot be surpassed in quality. Of beets, only the Dark Red Blood Turnip or the Egyptian should be planted for shipping purposes. The Egyptian is a very quick growing variety, and should not be sown quite so early as the Blood Turnip, which ought to be sown in September and October; for the former variety January is time enough. The seed for the strain of beets which we recommend is raised in Connecticut, it is a dark red, very early and cannot be surpassed for shipping purposes. Several new varieties have come into cultivation, some lighter in color, like the Lentz and Dewings; they are a trifle earlier, but do not come up to the strain of Extra Early Dark Blood Turnip. The Eclipse is another good variety, but is smaller. Also introduced by the late Richard Frotscher.

For tomatoes, Extra Early Dwarf comes in bearing first, but should be planted only for the first crop, as when large varieties come in the market the former do not sell as well. Great improvements have been made of late years in tomatoes; the varieties raised and introduced by Livingston's Sons are perfect, and hardly any improvement can be made on such varieties as the Paragon, Favorite, Acme and Beauty.

Lettuce is shipped quite extensively; the New Boston Market is used principally, and cannot be excelled for that purpose by any other variety.

The onion crop is one of the surest and most profitable. From Creole seed failure to make a crop is almost unknown.

Early potatoes pay well.

Cabbage is by far the most important and profitable crop we have. It is the mainstay of the truck farmer.

The musk melon is also usually a good paying crop. In favorable seasons, when the quality is good, the demand is large and prices high.

Egg-plants have been shipped in large quantities of late years.

Carrots and turnips ship well, and paying prices generally are to be had.

Radishes have also proved to be a profitable shipping crop.

THE HOTBED.

On account of the mild winters in the South, the hotbed for forcing vegetables is but little used by the Southern trucker, except to start the germination of seeds, such as tomatoes, pepper and egg plants, and yet the hotbed, assisted by cold frames, can be made a valuable adjunct to modern Southern truck farming, because the hotbeds for starting the seed and the cold frame to transplant the young plants several times to make them hardy and stocky, enables the Southern growers to gain much valuable time. The early vegetables catch the early buyers and the top prices. Even a few days or a week makes a big difference in the prices and amply repays the trucker for the labor and material required to construct and operate the hotbed and cold frames.

The Southern gardener who expects to grow tender vegetables, such as tomatoes, egg-plants, pepper, cauliflower, cabbage or celery, without the assistance of the hotbed and cold frames, is not up-to-date and cannot expect to compete with the more intelligent grower.

To make a hotbed is a very simple matter. Anyone who has the use of tools can make the wooden frame; the sashes can be obtained from any sash factory. We consider a wooden frame from five to six feet wide and ten feet six inches long a very good size. It should be at least six inches higher at the back than in the front, and covered by three sashes 3½x5 feet. The manure ought not to be more than a month old; it should be thrown together in a heap, and when commencing to heat, be worked over with a fork, and the long and short manure evenly mixed.

In low ground the manure should be placed on the top of the ground; make the bank of manure two feet longer and two feet wider than the frame, as the cold soil would absorb the heat too rapidly. On elevated or sloping ground, a trench may be dug to conform with the size of the frame two feet deep. Keep the edges straight and the corners firm; when the manure is about eighteen inches trample down to six or eight inches, then put another layer of eighteen inches and trample down again; place thereon the frame and sash and fill in six inches of good earth. After about five days stir the ground to kill the weeds which may have come up, then sow the seeds, either broadcast or in drills.

After the plants are up, the minutest daily care must be bestowed upon the proper heat of the bed, by constantly watering with tepid water and airing the plants; on warm days, when there is no frost in the atmosphere or severe cold wind, uncover the beds. The life of the plants depends on this constant attention, and remember, the more air your plants

get, the hardier and stockier they will be. If seeds are sown too thick and plants are crowded, they will grow spindling, soft and hard to handle. Every little plant must have its little room in order to develop into a useful plant. After the young plants lose what is termed the seed leaves and show growth of the permanent leaf, the plants are ready for the cold frame. At first, plant the little plants about two inches apart each way; after from two to four weeks old, or as soon as the plants become crowded, replant in another cold frame about six inches apart each way, and keep all cover off on warm days. Plants treated in this way will be hardy, large and even show bloom buds when ready for the fields. Many gardeners, at the last transplanting, use pots to plant them in, which are taken to the field and the plants are set with the entire contents of the pots adhering to the roots. This is a self-evident advantage, as the plants hardly realize the change and continue to grow without even wilting down when copiously watered. The main idea is to gain time, and all of these minute attentions to the plants accomplish the object.

HOW TO MAKE AND OPERATE A COLD FRAME.

Select any piece of ground well drained and handy to water, and, if possible, sheltered from the cold north wind by a house, barn, fence or hedge. Plow or spade the ground. Now get some boards 1x12; set up on edge east and west parallel 4 or 5 feet apart. Set the north board on top of the ground; lower the south board four inches in the ground; this gives you a slope to the south. Get some short boards to close the ends; bank up the soil or manure on the outside all around. Nail some slats across the top every four feet to hold the frame firm. Now get some good, rich soil from your barnyard, not too strong, and sift this into your frame, so as to raise the side four inches above the outside soil. This insures drainage after heavy rains. Rake and pulverize well.

The beds are now ready for transplanting the young plant removed from the hotbeds.

From now on watch the weather report; if reported that the temperature may fall below the freezing point, cover up; keep covered until danger is past. *Never uncover in bright sunlight.* For cover you can use glass sash, domestic, old sacks, doubled and sewed together, or boards across the top, covered with manure or hay; be careful not to leave any opening for the cold wind.

The earliness of the crop will depend on the condition of the weather and the care that is bestowed on the plants in the frame and in the field

We give first the formulas and receipts for mixing the different inafter the plants are set out; remember plenty manure and plenty cultivation are the watchwords for an early vegetable crop.

INSECTS AND INSECTICIDES.

There will be no need for us to dwell upon the importance of insects and their destructive habits in the orchard, fields, gardens or poultry yards, and the remedies for the same, as any one familiar with farm life has observed the tenacity of insect life, the multiplication and rapid reproduction of the species (many of the minutest becoming grandparents in less than 24 hours), will agree with us on the importance of the subject. Indeed, the time has arrived when all culturists must provide safeguards and remedies for insects to protect their crops, the same as they must provide seeds, fertilizers, cultivation and even lands to plant the crop on. It is therefore advisable for our readers to study this chapter closely, as often a preventive or a cure may be the means of saving an entire crop, the crops of an entire neighborhood or country.

The department of agriculture reports the annual loss by insects on farms, orchards, gardens and forests in the United States to amount to $7,141,200,000 ever year, or more than enough to run the budget of the annual expenses of the entire national government.

secticides, to be followed by instructions on how to apply to each fruit or vegetable enumerated in this book.

FORMULAS.

Any of the sprays mentioned can be applied with comparative safety to any plant or foliage if moderation and judgment is used. Personally, we are strong advocates of Bordeaux mixture, as it has so many good qualities.

PARIS GREEN FORMULA.

Paris Green	1 pound
Fresh (unslaked) lime	1 pound
Water	200 gallons

Paris green is heavier than water, and the mixture must be kept in constant motion during spraying operations to prevent settling.

If is often adulterated.

Gypsum and slaked lime are two adulterations commonly used.

Pure Paris green dissolves without sediment in ammonia; the adulterant will not. This affords a simple test for purity.

Paris Green, if used on growing plants greatly in excess of the above formula, may injure the foliage. The addition of the lime overcomes the caustic properties and renders it safe under all conditions.

Dry Paris Green may be used pure if applied in small quantities. Different "dry powder guns" have been invented for this purpose.

POISON FOR BITING INSECTS.

Arsenate of lead	2 pounds
Water	50 gallons

Arsenate of lead is a combination of white arsenic, sugar of lead and sal soda. It may be prepared by combining these materials in proper proportion, but the process involves considerable labor and danger, as the ingredients must be combined by boiling. At least two firms now offer this valuable insecticide prepared ready for use, viz.:

The Bowker Insecticide Co., Boston, Mass., and the Merrimac Chemical Co., Boston, Mass.

The Bowker Company's preparation is sold as "Disparine," and the other as Swift's "Arsenate of Lead."

Arsenate of lead is less liable to injure foliage than Paris Green.

It remains longer in suspension.

It adheres better to foliage.

It may be used for any purpose for which Paris Green is employed in liquid sprays. Disparine was used in past season, and with perfect satisfaction.

WHITE HELLEBORE.

Powdered white hellebore is commonly employed to destroy currant and cabbage worms and on fruits and vegetables where more poisonous substances cannot be used with safety.

White hellebore	1 ounce
Water	2 or 3 gallons

It may also be used dry either alone or mixed with flour, land plaster, soot, etc.

White hellebore is scarcely poisonous to the higher animals, and may be used freely on fruits and vegetables at any stage of maturity.

KEROSENE EMULSION.

Used only to destroy sucking insects. It may be applied to the insects, and cannot be used as a preventive.

This is the standard remedy for sucking insects.

Dissolve one pound hard soap in two gallons of boiling water.

While hot add two quarts of kerosene.

Churn or shake the mixture while hot for five or ten minutes or until it assumes a creamy consistency.

Add six gallons of water before using.

Another plan consists in using sour milk instead of the soap water, the object in either case being to hold the kerosene in suspension while it is applied to the insects.

The most approved method of applying kerosene is by means of a special pump designed to mix kerosene and water. These pumps are made by different firms in various sizes, from a hand-pump or syringe, which may be had for 75 cents, to a barrel pump costing $20. This is the cheapest, most agreeable and by all means the best method of applying kerosene.

FUNGICIDES.

The control of fungus diseases is accompanied by the use of some form of copper salts, usually copper sulphate or copper carbonate.

The former, known as blue stone, blue vitriol, etc., is generally recognized as more efficient than the latter. When purchased in large quantities it is also cheaper.

Copper sulphate may be used on dormant plants when dissolved in water at the rate of two pounds to fifty gallons of water, but this solution must not be used on growing plants.

Copper sulphate in combination with fresh lime forms the standard and well-known fungicide.

BORDEAUX MIXTURE.

Various formulas are quoted, but the following is now accepted as safe and reliable:

Copper sulphate	5 pounds
Fresh lime	5 pounds
Water	50 gallons

In general terms the copper sulphate should be dissolved in one-half of the water, the lime slaked in the remainder, and the two solutions poured together. This results in a chemical action giving rise to a new substance, preserving the fungicidal properties of the copper sulphate, and if properly made will not injure foliage.

MAKING BORDEAUX MIXTURE.

(1) Have on hand three barrels and two pails (wood or fiber).

(2) Twenty-five gallons of water in each of two of the barrels.

(3) Dissolve five pounds of copper sulphate in one barrel by suspending in a coarse burlap as near the surface of the water as possible; in this way it will dissolve in a few minutes, while if allowed to settle to the bottom it would require several hours, or even days, to dissolve.

(4) Place the lime in a pail and slake by adding water slowly until a paste is formed. (The lime for Bordeaux mixture should be slaked exactly as for building purposes.)

(5) Pour this lime paste into the second barrel and stir thoroughly.

(6) Now pour into the third (empty) barrel first a pailful of copper sulphate solution, then a pailful of the lime water, or, better, let two persons work at the job, pouring together.

(8) The resultant mixture should be of an intense blue color. If any tinge of green appears it is not good Bordeaux mixture.

(9) The lime water should be strained to remove the coarse particles which serve to clog the nozzles in spraying.

(10) Sufficient lime must be used to combine with all of the sulphate or harm will result. The formula given above provides an excess, but such excess is preferable to a slight deficiency. Use all of the lime water.

(11) Test the mixture. It is always advisable to test every barrel of the mixture before using to detect the presence of any free or uncombined copper, which might injure foliage.

TEST NO. 1.

Dip a bright, clean steel knife into the prepared Bordeaux mixture; if any, even the slightest, deposit of copper appears on the blade, after a few moments' exposure to the air, it is an indication that more lime is needed.

The knife blade should be thoroughly wiped before using for a second test.

TEST NO. 2.

Ferro-cyanide of potassium may be purchased at any drug store.

Place a small quantity (one ounce) in a bottle and add water slowly until nearly all of the yellow crystals are dissolved. Stir the Bordeaux thoroughly and dip out a few ounces in a saucer. Add a few drops of the ferro-cyanide solution; if any brown discoloration appears it is an indication that more lime is needed. This is a delicate and reliable test.

The ferro-cyanide is a violent poison and should be labeled as such.

THINGS TO AVOID.

(1) Do not use iron or steel vessels for the sulphate or Bordeaux. Not only will these be corroded, but the chemical action resulting from continued contact may injuriously affect the mixture. Tinned or galvanized pails are unsafe, as the zinc or tin coating is apt to be imperfect. Use only wood, copper, earthenware or glass.

CORROSIVE SUBLIMATE.

Corrosive Sublimate	15 gallons.
Water	2 ounces.

LIME, SALT AND SULPHUR.

Stone lime	50 pounds.
Flow of sulphur	50 pounds.
Stock salt	50 pounds.
Water	150 gallons.

COMBINED INSECTICIDES.

Paris green	¼ pound.
Lump lime	5 pounds.
Copper sulphate	4 pounds.
Water	50 gallons.

There are many other individual insecticides, such as tobacco dust, ashes, slugshot, lime, salt, etc., for use in the seed beds and fields, which we will mention below.

SPRAYING.

Manufacturers supply the culturists with many devices for spraying, from the wagon to the hand-spraying pump, which are most commendable, according to their utility to accomplish the object with dispatch and economy; the liquid that falls on the ground is mostly wasted, therefore the more penetrating and finer the spray, the more economy. In spraying, great care must be taken to spray as near as possible the under side of the leaves where the most insects are located. The reason two or three sprayings are necessary is because the first spraying may kill all the live insects and yet fail to reach the eggs, which are deposited in concealed corners and nooks of the plants. These will hatch in a few days, when a new spraying would become necessary to kill this new brood.

As most spraying preparations are poisonous and injurious, caution should

be used to keep the liquid from the eyes, mouth and skin as much as possible, and personal cleanliness should be rigidly practised by the operator after spraying.

VEGETABLES.

Asparagus—For rust spray twice with the Bordeaux mixture, with an intermission of ten days.

Beans—When the striped beetles, small black bugs, or white worms appear on beans, spray twice with the kerosene emulsion, with three days interval.

Beets—Beets have few enemies, except the crownborer and lice on the leaves; both may be destroyed by two applications of the kerosene emulsion a few days apart.

Cabbage—Club foot or root rot; there is no remedy for these evils except change of ground, as cabbage grown in succession on the same land develops these diseases. Lice on cabbage may be destroyed effectually by spraying with the kerosene emulsion twice, with six days interval. Cabbage worms may be checked by dusting the leaves while the cabbage is young with Paris green applied in the morning when the leaves are wet with dew; spraying with liquid Paris green or kerosene emulsion has also a pronounced effect to check the worms. For the cabbage moth and worm in the seed beds, apply after watering the beds, tobacco dust, slugshot or Paris green.

Celery—Leaf blight in celery may be checked by spraying with Bordeaux mixture every ten days until improvement appears; for the caterpillar, dust with Paris green, slugshot or tobacco dust.

Carrots—With the exception of the army worms and lice, carrots are very free from enemies; should they appear, one spraying with Bordeaux mixture or kerosene emulsion will destroy either of them.

Cauliflower—The treatment for worms and lice on cauliflower is the same as for cabbage, with the exception that more care must be exercised to keep any of the mixture from the flower, as it will turn the flower black and unsalable.

Corn—Corn, especially sweet corn, is frequently infested with a worm in the ends. As a fly or moth flies at night and deposits the eggs from which the worm is hatched, there is no apparent remedy except to kill the moth by lights of fires at night.

Collards—Collards, like cabbage, are frequently attacked by lice and worms and the same treatment as for cabbage applies.

Cucumbers—The worst enemy of the cucumber is the yellow-striped bug; some seasons this bug is so numerous and so persistent as to ruin entire crops and make the growing of cucumbers hazardous in some localities. The only remedy we ever found is daily hoeing and cultivation until the plants become hard enough to resist the attacks of this bug; no insect likes to be disturbed and persistence in getting after the bug is probably the best remedy; the sprinkling of lime, tobacco dust, sulphur or Paris green is commendable around the hills.

Egg-Plants—Egg-plants are sometimes attacked by the leaf roller in some localities, also by worms and lice. Clean cultivation and spraying with the Bordeaux mixture or kerosene emulsion affords a remedy.

Lettuce—Lettuce suffers mostly from the depredation of a small white worm and lice in droughty weather. A weak solution of either kerosene emulsion or Bordeaux mixture will prove a remedy when applied with the spray pump. In the greenhouse or hotbeds the only known remedy is to smoke the entire room with burning tobacco stems for twelve hours.

Melons—Cantaloupes are attacked by the yellow striped bug, and the remedy for the bugs advised on cucumbers must be applied. Rust and blight occur in some localities on cantaloupes and destroy whole crops, and great care and caution must be exercised to combat these diseases; on the first appearance of rust or blight, or even the very first appearance of something wrong with the foliage, the whole field must be immediately sprayed with the Bordeaux mixture, and sprayed successfully three or four times every third day. This is the only remedy known and the whole crop may be lost by neglect; it is even advisable to spray the cantaloupes once when the first blooms appear, as this may act as a preventive. Cantaloupes are a valuable crop and the cost of spraying is insignificant with the profitable results.

Watermelons—The watermelon louse and the yellow-striped bug are the only serious insects to attack watermelons and the spraying with the Bordeaux mixture or kerosene emulsion will prove both a preventive and a cure. For watermelon blight or rust, spray the same as for cantaloupes.

Onions—Many complaints are current from Southwest Texas, Florida and other Southern points about the destruction by the onion louse to the onion crop, and this louse is exceedingly difficult to check or destroy, because the parent louse stings the onion tops and deposits the eggs on the inside of the tubes where they can develop and destroy the nutrition necessary for the bulb. Either dusting or spraying with insecticides avails but little, as the young lice are safe and secure behind formidable walls.

Where the onion field has become seriously affected and its destruction is feared, the tops must be cut off and removed from the field and burned with inflammable material; the field must be then thoroughly and slowly sprayed with the kerosene emulsion. The application of the kerosene emulsion once or twice on the first appearance of the louse will prove a preventive for infection and cure.

Potatoes—Irish potatoes, in comparison to other plants, are affected with few diseases or insects; the potato blight may sometimes appear and the tops must be immediately sprayed with the Bordeaux mixture, and sprayed again in four days. The Colorado potato beetle is the worst insect to annoy the potato growers; dusting the tops with Paris green while the tops are wet with dew or rain is the best remedy, or the tops may be sprayed with the combined insecticide, Paris green, lime, copper sulphate and water. Read formula above.

Potato Scab—Corrosive Sublimate..... 2 ounces.
Water .....15 gallons.

Dissolve the corrosive sublimate in two gallons of hot water, then add balance of water. Allow solution to stand four or five hours, stirring occasionally. Place the seed potatoes in a coarse sack and immerse in solution for one and one-half hours. Corrosive sublimate is very poisonous, and care should be taken in handling it.

Potatoes—Sweet potatoes up to this time have had but few enemies besides the gopher, but lately many questions are received in our Question and Answer Department about the sweet potato root borer. In some parts of South Texas the borers have become so bad that they ruin entire crops and even sweet potato culture is being gradually abandoned.

Remedy—If a crop is once attacked there would be no remedy and the crop should be destroyed by fire. Plant your crop in entire new land where no sweet potatoes have been grown for several years, as the larvæ or eggs are deposited by the bug in the outer skin of the potatoes; soak the sweet potato seed which you are about to use in corrosive sublimate, the same as Irish potatoes, for one hour. If this is done every year the borers will not trouble the potatoes.

Spinach—Spinach is sometimes attacked by lice, especially during dry weather. Two sprayings of kerosene emulsion four days apart will prove en effectual remedy.

Squash—The squash is attacked very generally while young by the yellow-striped bug. Constant cultivation and sprinkling of lime, ashes or sulphur around the hill is the only remedy; for the squash bug the plants should be sprayed with the Bordeaux mixture.

Tomatoes—Early in the season tomato plants suffer quite severely with the tomato worm, similar to the tobacco worm. Hand-picking the worm or dusting the tomato vines with Paris green while wet with dew are the only remedies known. In the fall the fruit is subject to the common boll worm. All affected fruit should be immediately picked off and destroyed, the field kept clean by cultivation; spraying with the kerosene emulsion at intervals also checks the worms. As a moth deposits the egg in the young green tomatoes at night, there is but little to be done, but the presence of any insecticide on the plants has the tendency to keep the moth away.

FRUITS.

Apples—The apple trees and fruits are subject to many diseases and insects, and spraying must be resorted to in all orchards during fruiting season, and the spraying must be done more to prevent the appearance of the diseases and insects, for after an apple orchard is once affected with the scab, leaf spot, bitter rot, rust, coddling moth, canker worm, caterpillar or lice, most of the harm is already done. Spraying after these conditions exist may prove of benefit to the trees, but very little to the fruit. Where the orchard has suffered the previous year by these depredations the only safe way is to spray at once in the spring and continue to spray in regular periods, as described below, during the early growing season. The best spray for all the complaints is the Bordeaux mixture. The first spraying should be done after the buds are swollen, the next when the young fruit makes its appearance, the third spraying two weeks later and continued with two weeks intervals until the fruit is nearly grown, when all danger will be past. For wooly aphis remove the soil from the roots and apply water in which tobacco stems have been soaked or apply tobacco dust, one pound to the tree and follow with water; cover up the roots then and the wooly aphis will disappear.

Pears—For pear blight, cut out all affected wood twelve inches below the dead wood and burn the same; keep the tree in as healthy condition as possible by perfect drainage and irrigation and clean cultivation. There is no other remedy or safeguard. For the codling moth or canker worm spray twice with the kerosene emulsion ten days apart.

Peaches—The peach blight is the most serious drawback to peach culture and is the recognized consequence of unseasonable, inclement weather, over which we have no control; warm spells followed by cold weather in the spring is the main cause of blight, even if blight does not appear until late in the summer. Spraying the trees with any emulsion has no effect

and does more harm than good, as it further devitalizes the tree; the only benefits that may be bestowed on a blighted peach tree is judicious trimming, clean cultivation, fertilizing to assist the tree as much as possible to regain its former strength and vitality. No other course can be pursued with satisfactory results in peach blight. For the peach borer, clean away the soil twelve inches deep in the fall, wash the base of the trees with ashes and water, leaving the sediment of ashes around the roots in the hole; the borers may also be detected and removed with the knife; the hole should be left open until spring and then refilled. For the leaf curl, rot or curculio, spray the trees three times with the Bordeaux mixture in intervals of ten days.

Plums and Persimmons—Both plums and persimmons are very commonly attacked by the curculio, tree louse and leaf roller. Two sprayings of either kerosene emulsion or Bordeaux mixture eight days apart will prove an effectual remedy.

Oranges—The worst enemies of orange culture are the scale insects, orange louse, blight or dieback. For the scale insects the spraying of the trees ten or fifteen days apart with the kerosene emulsion is an absolutely safe remedy. We have ourselves sprayed hundreds of orange, lemon and lime groves in Florida with the most flattering success. The scale insect is protected by inverted oval scale, glued to the bark of the limb or tree with a sticky, tenacious substance, emitted from the body of the scale; this glue or substance is not soluble in water, Bordeaux mixture or any other spray mixture, except kerosene, which at once loosens the scale and kills the insect, but under the outside scale, which protects the parent scale, are numerous minute scales, perceptible only with the strongest microscope, and these in turn will take the place of the parent scales, reproduce again the protected scales, and it follows that one spraying would avail but little; the trees must be sprayed at least three times and about ten days apart, and even then close watch must be kept all during the summer and fall period for succession of the scales which escaped the kerosene emulsion spray. The kerosene emulsion, if properly made and diluted, will not injure the young and tender foliage or the fruit. Orange mites are minute insects which locate only on the fruit, absorbing the oil of the peeling and cause the rind of the oranges to become dark or black, and these oranges are commonly known as Russetts. These mites work mostly on the fruit in the shade and quite frequently we observe oranges quite yellow and bright on the side exposed to the sun, even describing the orbit of the sun by a complete circle of bright rind. The only remedy for the mites is spraying with the mixture known as the combined mixture of

Paris green, lime and copper sulphate, as described in our formula above. The young oranges must be sprayed while the size of hazelnuts, and again when the size of walnuts, and even later again should the mites persist in appearing. The die back or blight ocurs mostly in hammock and low, wet ground in the flat woods and on prairie; there is no remedy for this, except to trim back below the green and healthy wood.

Figs—Figs have no insect enemies of any serious consequence; the fruit will drop before ripening, either from excessive moisture or extreme droughts; either drainage or irrigation must be applied.

Grapes—Grapes are subject to many diseases and insects, such as the black rot, anthracnose, mildew, the grape cane borer, the grape leaf folder, the grape berry moth and grape louse. Grapes affected with the above should be at once treated to clean cultivation and all diseased wood removed with the pruning knife; the application of pure potash at the rate of about 150 pounds to the acre is of great benefit to all diseased grape orchards. Commencing in the spring when the buds begin to swell spray thoroughly with the Bordeaux mixture and repeat when the young fruit has made its appearance. Should signs appear of continued disease or insect, repeat the spraying several times during the summer. By following the above directions any diseased grape orchard may be placed in a healthy and vigorous condition.

Plant Lice—In the hotbed, greenhouse, conservatory or on house and window plants, may be effectually destroyed by 2½ pounds of Quassin wood soaked in ten quarts of water and then well boiled, strained through a cloth and placed with 100 quarts of water in a kerosene barrel with five pounds of soft soap. The mixture is then ready for sprinkling upon plants infested with lice. The most delicate plants are not injured by the application and the mixture may be covered over and kept from spring to fall without deterioration. The solution should be used as soon as the insects are found, and if it is repeated several times, they will entirely disappear.

BUDDING AND GRAFTING.

The art of budding and grafting in horticulture is practiced for the purpose of obtaining fruits true to their specie, and to hasten the bearing of fruit trees, and for economic reasons.

Also many of our choicest fruit trees are possessed of an inferior and weak root system and are vastly improved by being budded or grafted on well recognized, vigorous roots of other species of the same varieties of

fruits. There are other advantages of budded fruit trees over seedling trees. Fruit from budded trees contain less seeds than on fruit trees propagated from seeds, and through constant budding many fruits have become entirely seedless, for Nature is quick to respond to the requirements of man. Budded trees are inclined to be slightly dwarfish in growth, and produce lower-crowned trees, which is also more of an advantage than otherwise in fruit trees, as it facilitates spraying, pruning and harvesting.

The art of both budding and grafting is not difficult to learn as long as the principle is understood, and yet some practice is necessary before entirely satisfactory results can be expected, and by reading carefully our directions below any one may either bud or graft, with partial if not with entire success.

BUDDING.

A method of reproducing plants, and for perpetuating varieties by inserting a bud or bud scion into a stock. There are numerous styles of budding, such as shield budding, square and circular shield budding, flute budding and ring budding. As shield budding is mostly used in this country, we will describe only that method. The bud is taken from wood of the present year's growth. Since the work of budding can only be done during the season of active growth, the bud-sticks are usually prepared so that the petioleon stem of each leaf is left attached to serve as a handle to aid in pushing the bud home, when inserting it beneath the bark of the stock. The stock for budding should be at least as thick as an ordinary lead pencil. With the apple and pear a second-year growth will be necessary to develop this size, but with the peach a single season will suffice. Peach stocks can be budded the same season the pits are planted; consequently the peach is left until as late in the season as is practical, in order to obtain suitable size of stock. The height at which buds are inserted varies with the operation. In general, the nearer the ground the better. The cut for the reception of the bud is made in the shape of the letter T usually, the cross-cut is made at a slight angle with the body of the tree, instead of at right angles to it, and the stem to the T starts at the cross-cut and extends toward the root for an inch or more. The flaps of the bark, caused by the intersecting of the two cuts, are slightly loosened with the ivory heel of the budding knife, and the bud grasped by the leaf stem as a handle is placed under the flaps and firmly pushed in place, until its cut surface is entirely in contact with the peeled body of the stock. A ligature is then tightly drawn above and below the bud to hold it in place until a union shall be formed. Bands of Rafis Jute cloth, prepared with grafting wax, ten inches long, make most convenient tying material. As soon

as the buds have united with the stock (taken), the ligature should be cut in order to prevent girdling the stock and bud. This done, the operation is complete until the following spring, when all the trees in which the buds have taken should have the top cut off just above the bud. This forces the entire strength of the roots into the bud, and since the root itself has not been disturbed by transplanting, a more vigorously growth usually results from the bud than from scions in whip or crown grafting.

Budding is one of the most economical forms of artificial reproduction, and each year witnesses its more general use.

Some nursery men have gone so far as to use it as a substitute for all other modes of grafting, save whip grafting, in the propagation of the dwarf pear.

Budding is economical in the amount of wood used, from which to take buds or scions, since a single bud does the work of the three or more upon the scion of the cleft or whip graft. But it is expensive in the use of the stocks, a seedling being required for each tree, while with the piece-root system of grafting two or three or more stocks can be made from a single seedling.

The one objection to budding is that it causes an unsightly crook in the body of the tree, unless the tree is planted deep enough in the orchard to cover the deformity. In vigorous climates, where trees, upon tender roots are likely to suffer from severe winters, like the orange, a bud of a hardy sort upon a tender root is no hardier than the root, because budding leaves a portion of the stock exposed above the surface of the soil, and thus precludes the possibility of the development of roots from the portion above the bud, while the piece-root grafted tree with a long scion is practically the same as a tree propagated from a cutting, as the scion will strike root and the new plant will be upon its own root.

In regions where severe winters do not enter as a factor, there are undoubtedly a number of reasons why budding will be the most desirable method of reproducing horticultural varieties.

GRAFTING.

Grafting is an operation by which the cut surfaces of two branches or roots, either from two different plants or from the same plant, are caused to grow together. The portion used to perpetuate its kind, usually of the present or past season's growth, is called a scion.

The portion into which the scion is inserted is termed the stock, and usually carries roots, or is part of a root, although in rare cases unrooted cuttings are used as stocks. The success of grafting depends entirely upon

the ability of plants to heal wounds. When two wounded surfaces of cuts are so adjusted that the cambium layer of one coincides at any point with the cambium layer of the other, union by granulation of the two surfaces takes place, connecting between the conducting vessel of stock and scion becomes established, and new growth begins. The great value of grafting consists in the ease and comparative certainty with which cultural varieties can be increased without serious loss of type character. Were all forms of the art of grafting to be taken from the horticulturist, commercial fruit tree growing in its high state of perfection would decay with the orchards existing at this time. All horticultural varietes of sorts of fruits that belong to the Pome, the Drup, of the citrus classes, are now multiplied almost wholly by grafting, which includes both budding and grafting. The most popular methods of grafting are the whip and the cleft.

WHIP GRAFTING.

For whip grafting of the roots the scion should be cut in the fall, because spring cutting allows insufficient time for the union of the two surfaces below growth starts. This style of grafting is the one most extensively used in root grafting. It is well suited to young plants or parts of plants used as stock, and to indoor work during leisure of winter. Both the stock and the scions are cut diagonally and smoothly, with a sharp knife, leaving about an inch of cut surface, across which, in both stock and scion, a slit is made parallel with the direction of growth. The one object to secure is the juxtaposition of the cambium layers of the stock and scion. This may be accomplished by having the bark of the stock coincide with or cross the bark of the scion at a slight angle. After the scion and stock have been joined they should be wrapped with several turns of cotton soaked in grafting wax, in order that the parts may be held firmly together. The root of the stock may be left any convenient length from two and one-half to six inches, and the scion cut according. This cutting, however, is usually done before the joining of the two parts. In general, the shorter the root, the longer the scion, and vice-versa. The practice of the more vigorous climates tends to short piece-roots and long scions. The resulting trees, being deeply set over, send out roots from the scion and become own rooted, in which case they are believed to be superior to trees that obtain their nourishment solely through the foster root of a stock.

No experiments have been conducted to settle this matter, but common experience is more in favor of the short root deeply set than the reverse. At planting time, root grafts thus made should be covered only to the topmost bud, the scion being left above the soil. If the graft is to be exposed

it should be covered with wax muslin or with hard wax. When deeply planted in a furrow, or with dibble, the waxed cotton will be ample protection.

CLEFT GRAFTING.

Cleft grafting is particularly adapted to large trees when the varieties are to be changed. Branches too large to be worked by other methods may be cleft grafted. But as a rule the larger the branch the less satisfactory will be the result. A branch one or one and a half inches thick is severed with a sharp saw. The stub is then split with a thin chisel, or with a grafting instrument, and held open with a wedge, until the wedge-shaped scion is inserted and adjusted. The scion should consist of a portion of the previous season's growth of the variety to be propagated, and should be long enough to have two or three buds. In general, it is a good plan to cut the scion so that the basal or proximal bud shall be at the base of the opening of the triangle formed in cutting the scion into wedge shape, necessary in this style of grafting. In addition to the advantage of having the proximal bud located as above described, the wedge of the scion should be made thicker on the side to face outward when the scion is in position.

The advantage of this is that pressure is brought upon the outer growing parts of both scion and stock, whereas were the scion thicker on the inner side the condition would be reversed and the death of the scion would follow. The importance of having an intimate connection between the growing tissues of both scion and stock cannot be too strongly emphasized, for upon this alone the success of grafting depends. To make this contact of the growing portion doubly certain the scion is often set at a slight angle with the stock into which it is inserted, in order to cause the growing portions of the two to cross.

Waxing, which is quite as important as the proper adjustments of all scions, be it budding, whip grafting or cleft grafting, consists in covering all cut or exposed surfaces with grafting wax, clay or some non-corrosive substance, which will exclude air and moisture. In warm climates the grafting wax should be made of harder and stiffer substance. For making grafting wax proper, read Part X of this book.

PART V.

IRRIGATION DRAINAGE AND FERTILIZERS.

IRRIGATION.

Irrigation is the systematic application of water to land, in order to promote present or prospective vegetation.

The art of irrigation is practiced for the reason to make up either for the entire absence of rain, or for a local deficiency of rainfall.

In the arid regions of the Western part of the United States irrigation must be depended upon entirely for the production of crops; in the middle part of the United States, or where rainfall is of paradoxical occurrence, or too much at one time or not enough at another, both irrigation and drainage form valuable auxiliaries to secure maximum results on the farm, in the orchard and garden.

In considering the vast importance of moisture to plant growth, it must be remembered that seeds absorb a very large amount of water, even before germination can begin; that the growth of the young plants, while still dependent upon the seed, involves the employment of a constant supply of water in order that the transference of nutrients from the stores in the seed to the newly developed parts, may proceed without interruption; that soils which do not contain more than 10 per cent of water will yield none of it to the plant, and that when such low percentages of water are approached there is a constant menace to the very life of the plant or the fruits. No rewards can be expected under such unfavorable condition to plant life.

It must also be remembered that all fruit or vegetable products when in a growing state, contain an immense proportion of water, as much as even 90 per cent. From all this it will be readily understood that artificial supplies of water are needed for vegetation in any arid or semi-arid country, and wherever the annual average rainfall is less than 20 inches, irrigation must be established and maintained.

The subject of irrigation to this country is now more important than ever before, as the tide of immigration trends its way westward to the arid regions, attracted by the rich alluvial soils and cheaper land. Ways and means must be explored to render those regions habitable and of promise to these pioneers. If all the snow and rainfall in the entire Untied States would be by Nature equally distributed all over the United States, there would be little need of employing irrigation in any part, but cyclonic disturbances, hurricanes, sudden changes from heat to cold in the atmosphere, cause at times heavy rainfall in some parts, at the expense of another part, and to remedy this unequal distribution artificial means must be em-

ployed to balance the account. In place of the rivers emptying their precious fluid needed for agriculture into the boundless sea the current must be curbed by dams, canals and reservoirs, to prevent inundation and disastrous floods in certain parts and stored for future use. The steps of the national government recommending interstate waterways are highly commendable as these waterways will not only provide cheap transportation of products, but will prevent floods and serve for irrigation as well.

WATER SUPPLY FOR IRRIGATION.

First—Natural streams, springs or lakes.

Second—Surface or artesian wells.

Third—Storage of storm waters.

Primitive or natural irrigation is derived from a stream, ditch or canal running alongside of the valleys of the stream at a less grade than the stream itself. The greater the fall of the stream or valley, the more thorough can irrigation be instituted and employed.

In the Western section of the United States artesian wells are the important course of water for irrigation, because streams are more scarce and unreliable for a permanent supply.

When artesian wells do not flow to a sufficient elevation to distribute over the growing crops, steam pumps, engines, windmills or horsepower must be employed to elevate the water to a sufficient height to flow into tanks or reservoirs from where in turn it may be applied to the crops.

WELL SINKING.

Wells from a few feet to a hundred feet are generally sunk by means of pick and shovel. In drilling wells at a greater depth a derrick, combined with a boiler, engine, drills and accessories are required. Derricks are generally twenty feet square at the bottom and about seventy-five feet high.

There are several systems of artesian well boring, such as the Pittman and "walking beam" and the rotary system, which have almost superseded the old style of boring at this date.

ARTESIAN WELLS.

The presence of artesian wells and water supply in any region depends upon the existence beneath that region of a tilted porous layer, inclosed between two impervious beds.

Artesian wells in all parts of the country yield a supply of water for domestic use, which in many instances is much purer than surface water. In the arid regions of the West, they also serve the purpose of supplying water for irrigation purposes, thus rendering fertile the soil of many districts heretofore non-productive.

The deepest artesian wells in the United States are at St. Louis Mo., 3,843.5 feet; Columbus, Ohio, 2,775 1-3 feet; Louisville, Ky., 2,086 feet; Pittsburg, Pa., 4,625 feet; Wheeling, W. Va., 4,500 feet, and Galveston, Texas, 3,071 feet.

The temperature of the water from artesian wells is commonly about 50 degrees, but varies according to depth of wells.

The depth of artesian wells in the arid West is from 300 to 1,500 feet, and rarely exceed that depth. All artesian wells diminish in flow, due either to partial filling of the tube or to a reduction of pressure, caused by too many wells being bored into the same strata or basin.

Artesian water impregnated with strong minerals, as salts, saline, alkali and ore beds, are sometimes found to be unfit for irrigation and all water from artesian wells should be analyzed before used as drinking water for man or beast or irrigation purpose.

Complete statistics, concerning the depth, cost, discharge and other features of 2,971 of such wells, fairly distributed throughout the various states and counties from which they are reported, have been obtained from the owners, and from the averages derived from such statistics, the number of artesian wells used for the purposes of irrigation is computed at 3,930; the average depth per well, 210.41 feet; the average cost per well, $245.58; the total discharge of water per minute, 440,719.71 gallons, or 54.43 gallons per well per minute; the average area irrigated per well, 13.21 acres, and the average cost of water per acre irrigated, 18.55. Over one-half of these wells are in the State of California. Utah stands second in the number of artesian wells used for irrigation purposes and Colorado in the area of land thus irrigated.

WINDMILLS.

The date when windmills were first erected is unknown, but they were certainly known in Europe as early as the Twelfth century. While there are many types of old and antiquated windmills still in use in the old countries, American windmills generally have the sails or wings in an annulus or disk. The American windmill presents a larger surface for a given length of sail, and the construction is also much lighter. To turn the mill face to the wind a simple large rudder or tail is used. The cost of windmills varies according to size and material; also whether or not it includes the cost of the tower. For an acre or one and one-half acres of truck garden, and where the water is less than forty feet from the surface, a suitable windmill tower, tank pump and pipes may be erected for about $200.00.

The horsepower derived from an American windmill in eight hours per day is as follows: ,

Diameter of Wheel in Feet.	Velocity of Wind in Miles per Hour.	Horsepower Derived.
8½ feet	16 miles	0.04 horsepower
10 "	16 "	0.12 "
12 "	16 "	0.21 "
14 "	16 "	0.28 "
16 "	16 "	0.41 "
18 "	16 "	0.61 "
20 "	16 "	0.78 "
25 "	16 "	1.34 "

PUMPS.

The different kinds of pumps, without regard to their motive power, may be classified as follows:

First—Bucket lifts, or water elevators, by means of which a balance pole, or sweep, a, windlass or a wheel lowers, raises or empties one or more buckets or other receptacle.

Second—Displacement pump, acting on the principle that two bodies cannot occupy the same place at the same time.

Third—Impellers, which by their own continuous motion in the water to be moved, impart some of their velocity to water with which they come in contact.

Fourth—Impulse pumps, which the force of a suddenly arrested large column of water, to lift a smaller column to a greater elevation than the original source.

THE CENTRIFUGAL PUMP.

The centrifugal pump is probably at this date the most economical pump used.

The pump consists essentially of a shell containing a revolving runner or piston. Water is drawn in through an opening in the center of this shell and is by the runner given a centrifugal motion, which drives it out through the discharge pipe on the periphery of the pump shell.

It has no valves and is not affected by sand, mud or grit, and will pass large bodies without injury.

The discharge is continuous and steady. Working with a rotary motion, perfectly balanced, and with no reciprocating parts, there is no vibration and the pump therefore does not require an expensive foundation.

The weight and floor space occupied, for the large amount of water de-

livered, are very small in comparison with other types of pumps, and the pump is consequently also very inexpensive in comparison.

It is very economical in operation; whether belt driven or by engine directly connected it will deliver the same quantity of water under same conditions as the ordinary reciprocating steam pump, with less than half the expenditure in fuel.

Th efficiency of the pump varies with the size, the type of pump, the amount of water delivered, the elevation, and largely by the design. Large sizes will, if carefully designed and built, show an efficiency of 85 per cent. not including friction in driving engine or in pipes. The average efficiency of the pump with from six to twenty-inch discharge is 60 to 65 per cent, and for smaller sizes 40 to 50 per cent.

The centrifugal pump is very flexible as regards capacity; a few revolutions faster or slower will greatly increase or diminish the amount of water delivered, but the highest efficiency is obtained when flow of water through discharge opening is from eight to twelve feet per second, according to size of pump. When best economical performance is desired, all details as to size of pump, size of suction and delivery pipes, and placing of pump, must be carefully considered.

The efficiency of a centrifugal pump may be computed as follows:

A No. 1 centrifugal pump will irrigate ten acres of land running forty days of ten hours each, and if lifting the water twenty feet will require a two horsepower engine.

No. 2 pump will supply twenty acres, requiring three horsepower.

No. 3 pump, forty acres, with six horsepower engine.

No. 4 pump, eighty acres, with ten horsepower engine.

No. 6 pump, 160 acres, with twenty horsepower engine.

No. 8 pump, 320 acres, with forty horsepower engine.

The prices of these pumps vary from $50.00 to $300.00.

ACRES IRRIGATED BY VARYING QUANTITIES OF WATER.

Showing the number of acres irrigated in one, ten and twenty-four hours, pumping various quantities, and irrigating various depths:

ACRES IRRIGATED BY VARYING QUANTITIES OF WATER

Showing the Number of Acres Irrigated in 1, 10 and 24 Hours, Pumping Various Quantities, and Irrigating Various Depths.

Gallons Pumped per Minute	Acres Irrigated in One Hour						Acres Irrigated in 10 Hours						Acres Irrigated in 24 Hours					
	1 In. Deep	2 In. Deep	3 In. Deep	4 In. Deep	5 In. Deep	6 In. Deep	1 In. Deep	2 In. Deep	3 In. Deep	4 In. Deep	5 In. Deep	6 In. Deep	1 In. Deep	2 In. Deep	3 In. Deep	4 In. Deep	5 In. Deep	6 In. Deep
600	1.3	.6	.4	.3	.2	.2	13.2	6.6	4.4	3.3	2.6	2.2	31.8	15.9	10.6	7.9	6.3	5.3
824	1.8	.9	.6	.4	.3	.3	18.2	9.1	6.0	4.5	3.6	3.0	43.7	21.8	14.5	10.9	8.7	7.3
944	2.1	1.0	.7	.5	.4	.3	20.8	10.4	6.9	5.2	4.1	3.4	50.0	25.0	16.7	12.5	10.0	8.3
988	2.2	1.1	.7	.5	.4	.3	21.8	10.9	7.2	5.4	4.3	3.6	52.4	26.2	17.4	13.1	10.4	8.7
1000	2.2	1.1	.7	.5	.4	.3	22.1	11.0	7.3	5.5	4.4	3.7	53.0	26.5	17.6	13.2	10.6	8.8
1200	2.6	1.3	.9	.6	.5	.4	26.5	13.2	8.8	6.6	5.3	4.4	63.6	31.8	21.2	15.9	12.7	10.6
1500	3.3	1.6	1.1	.8	.6	.5	33.1	16.5	11.0	8.2	6.6	5.5	79.5	39.7	26.5	19.9	15.9	13.2
2000	4.4	2.2	1.4	1.1	.9	.7	44.2	22.1	14.7	11.0	8.8	7.3	106.0	53.0	35.3	20.5	21.2	17.6

A CHEAP DRIVEN WELL.

Suitable for the Coast country and Western Texas.

In cases where the water is found in quicksand or fine sand we have used a much cheaper, and, we think, much better arrangement for obtaining water. We first sink (after digging to the water) a casing, say twenty inches in diameter; pump out the sand from the inside, sink this to a depth of say, fifteen feet below the water; then for a well point we use common galvanized iron, No. 20, say six, eight or ten inches in diameter perforating the bottom, say for ten feet with one-eight inch holes. This point is set in the center of the casing; submerge the perforations about five feet; then we fill the space between casing and pipe with fine gravel, withdrawing the casing as we fill. These wells will yield from 500 to 1,000 gallons of water per minute each, and can be put down for less than $40 each, including cost of point. We then connect together enough of these points or wells to supply our pump.

Thus it will be seen that it is not only feasible but practicable to pump water for irrigation; and that this can also be done at a less cost than the average New York or New England farmer expends annually per acre for phosphates.

RESERVOIRS.

Where small pump and power is used it is necessary to store the water in reservoirs, but where a No. 3 pump or larger is used, we would not advise the use of the reservoir, but would arrange to do our pumping direct to ditches, and thus save the cost of reservoir and the cost of pumping the water which is lost by evaporation and seepage from the reservoir. Of course, where they are using windmills and pumps of small capacities, it becomes necessary to have a storage reservoir, but we can see no economy in using a reservoir where pumps of larger capacities are used.

In many instances it would be cheaper to put down a series of wells, owing to the fact that the land is uneven or it is not practical to carry it too far in ditches, and in this case, as is being done by a number of successful irrigators, several wells are put down at different points. A portable engine is used and the pump erected on skids so that it can be quickly detached and moved from place to place, thus one outfit being made to serve several wells.

APPLICATION OF THE WATER TO GROWING CROPS.

The most simple and most economical way to apply water to growing crops is by furrow irrigation. A main ditch or small canal is filled with

water, and this ditch is connected with the head of every furrow. The surface of the entire land is never flooded, but the water is confined to the furrows and percolates laterally into the soil.

WHEN TO IRRIGATE.

In order to determine just when crops need water and when to apply it so that they will not suffer from drought, nor be injured by too frequent or too generous application, requires a knowledge and experience that can be gained only by practice and a close observation of various crops under irrigation. It is the experience of many practical irrigators that if an unlimited supply of water is available crops more ferquently suffer from overirrigation than from drougth. It is difficult to determine when the development of the crop is first arrested on account of a lack of moisture in the soil. Some experimenters maintain that this point can be more definitely decided by an examination of the soil than by the appearance of the plant, as the latter shows evidence of the check in its growth some days after it has occurred. Usually it is then too late to prevent serious loss, as the crop rarely recovers from such treatment, and seldom reaches the development it would have attained if it had been irrigated at the proper time.

Plants will usually indicate by a change in color or by their general appearance whether they need water or when they have been over-irrigated. Most field crops turn to a darker green when in need of water, and the leaves and stems show a tendency to droop or curl. The lower leaves assume a pale yellow. A crisp or dead appearance in the lower leaves is one of the best indications that a plant needs water. Grain which has suffered from drought may mature, but the straw will be small and short and the kernels will be shrunken and inferior in quality. Alfalfa and similar crops have the appearance of cured hay. Where field crops are over-irrigated the color of the foliagee becomes a yellowish green and the plants have a sickly appearance. These indications vary with the quality of the soil, so that it is impossible to lay down fixed rules to govern the number or frequency of irrigations. Only close observation for a number of years on the same farm will enable a person to tell by the appearance of the plants whether they need water or not.

The amount of moisture in the soil may be determined with sufficient accuracy for the needs of the plant by examining a sample taken a few inches from the surface of the ground. If it clings together when molded in a ball and shows the print of the fingers, there is moisture enough present. If the earth falls apart when the hand is opened, irrigation is needed.

As stated above, this point is passed some days before the plant shows indications of suffering.

Irrigation at night or cloudy weather is preferable to irrigation done during the day in bright sunshine.

After the fields, orchards or gardens are thoroughly watered, and as soon as the surface becomes dry, cultivators or small harrows should be passed over the ground or through the furrows, to avoid the forminng of a hard crust and to provide a dust mulch to retain the moisture.

ORCHARD IRRIGATION.

It was not until recent years that the deciduous fruit growers of the northern and central parts of the State discovered the importance of employing irrigation to make a better grade of friut. Sections that were producing immense quantities of fine fruit could have improved their product by irrigation, but they were doing well enough. They thought that irrigation would lower the quality of the fruit. This idea, perhaps, grew out of the results obtained by those who had tried irrigation without giving the subject proper thought and attention. It was found that irrigated fruit was soft and with poor flavor.

The trouble was, irrigation was done at the wrong time. Nevertheless, this objection stayed with the subject for many years, and it is still counted against irrigation by some growers. At the same time, fruit grown in damp soil, near the rivers, brings the most money and has the finest quality. The difference is: In the first case the task is engineered by a man, and in some cases irregularly done.

In the latter case, Nature did the work regularly and evenly. Peach orchards in such situations in the Sacramento valley have in recent years brought over $1,000 per acre yearly. This is under natural irrigation. Artifiicial irrigation on good soil can be made to nearly, if not actually, equal it. The point to keep in mind is that a tree will do its best when supplied with a certain amount of water. This is a fact beyond dispute.

IRRIGATE RIGHT.

It does make a certain amount of difference whether the trees get it naturally or artifically, but the water can be supplied the latter way so as to nearly imitate the natural supply. It should make little difference if it is so done, and such is a fact. That is a lengthy argument to present simple facts, but there has always been more or less argument against irrigating deciduous fruits.

The application of water in furrows is the best method for most, if not all, such fruits. The roots of this class of fruit trees run deeper than those of citrus trees, and consequently they will not need irrigation so often, but they will require a longer run of water to give the best results.

WHEN TO IRRIGATE.

Deciduous fruits that are irrigated near to the time of ripening are apt to be too watery and of poor flavor. It is this feature that has brought objections to irrigation. This feature will always have to be settled by the individual grower, as soils differ so that no set rule can be given. Men who have given attention to the detail of this part of fruit growing claim that with irrigation they improve the quality and increase the quantiy.

The general rule to follow is to keep the soil well saturated with moisture while the fruit is maturing and making size, but before the sugar forming or ripening period commences withhold the water, or stop irrigation long enough before this period to allow the surplus water to become exhausted. This is what takes place in the river bottom soils that are naturally sub-irrigated.

As the season advances the water table lowers and through the absorption of the water by the roots and by evaporation. The amount of water in the soil gradually becomes less. With this comes the uniformity of conditions that produce even and harmonious results that tell so strikingly on all kinds of vegetation, fruit trees and orange trees especially.

IRRIGATION POINTERS.

Too much water on or near the surface will injure fruit trees. Some orchards where water is plentiful are being ruined by too much of it, even in the mountains, where natural drainage is usually all that could be desired. The trees are sickly and the fruit is of little value.

The things to know are when to irrigate and how much. Just enough at the right times insures the best possibile result, but some growers seem to be unable to learn this.

When hardpan is near the surface care must be taken or the tree or vine is very likely to be injured if much water is applied in warm weather.

If too much water is used the fruit will drop and the trees show a sickly appearance in the middle of the spring. Moderate irrigation will not do this.

Where water is allowed to stand or there is insufficient drainage the leaves turn yellow, and if the trees are not looked to they are apt to die.

Deciduous fruit trees are injured by too much water and by allowing it to run around the body of the tree.

Fruit trees are often injured by too much irrigation—in fact, many are killed by it. It also spoils the fruit.

PROFITS OF IRRIGATION.

The profits from irrigation or growing crops are so varied, according to the locality and nature of the crops, that actual experience must first be harvested before that question can be effectually settled. We may with justice say that irrigation in the arid regions is all profit, because without irrigation there would not be any crop. Indeed, the same might be true in the semi-arid regions, for all crops without any exceptions need either a rain or irrigation at the right period. Any farmer has observed that if corn is blessed with a good soaking rain about the time it tassels out the corn crop is as good as made in the South. To apply, then, irrigation at this period to the corn would naturally develop the same result. Gardeners no doubt have noticed that when beans are in bloom and receive then a copious rain, the first picking of beans is assured, and what is true of beans is true of all other garden vegetables. There are distinct periods when plant life must have the necessary moisture to produce fruits, and this pronounced period is invariable about blooming time.

The profits from irrigation are not so much a factor as the assurance and the certainty that a crop may be made with the assistance of irrigation devices, even in the semi-arid regions, or any part of the South.

In Colorado, where irrigation is more expensive than any part of the Southern States on account of lack of humidity in the atmosphere and scarcity of water, one of our contributors writes as follows, and these figures may be accepted as very conservative:

THE INTRINSIC VALUE OF AN IRIRIGATED ACRE IN COLORADO.

The real value of an acre of land is fixed by the annual net profit it can be made to yield. In Colorado a property owner is not satisfied with less than ten per cent annual interest upon his investment. It is upon this basis that we have always calculated estimates in figuring on the earning capacity of irrigated land. Suppose that a 160-acre well established farm contains in one year fifty acres of potatoes, fifteen acres of beets, sixty acres of wheat and thirty of alfalfa. The average yield of potatoes is 100 sacks or 11,000 pounds to the acre; the average market price is not

less than 50c per cwt., or $55 an acre; the expense of cultivation is $20 an acre. This leaves a net profit of $35 an acre, or $1,750 for the entire crop of fifty acres.

The average yield of beets is fifteen tons and at the market price, $5.00 a ton, the gross return is $75. The expense of cultivation is $40, which leaves a net profit of $35 or $525 for the crop of fifteen acres. The average yield of wheat is thirty-five bushels or 2,100 pounds to the acre, which at the average market price of $1.00 per cwt. returns $21. The expense of cultivation is $5.00, leaving a net profit of $16, or $960 for the crop of sixty acres, when the season is all right. The average yield of alfalfa is four tons from a good stand, which at the market price of $4.00 a ton gives $16 an acre; the expense is $3.00, leaving a net profit of $13, or $390 for the crop of thirty acres. While the cash profit on alfalfa is comparatively small the crop is invaluable as a fertilizer.

By adding these profits we find that such a farm would net above all expenses a grand total of $3,625. This sum divided by 160 gves $22.65 as the net acre profit. This profit then becomes the interest upon its real value. Placing that at ten per cent per annum and multiplying by ten, it becomes evident that such a farm is worth to its owner $226.50 an acre. These estimates are extremely conservative and are realized every year by any number of representative farmers who know how to plow, sow, till and reap. Ordinary estimates range from $20 to $40. No estimate on irrigated land is lower than $20, and consequently such a farm is worth only $200 to the acre.

However, many farms all over the country have given yields far above these figured estimates. For instance, a 100-acre farm near Eaton netted $9,967, or $62 an acre; and a 130-acre farm yielded $8,000, or $61.50 an acre. Of course there are some farms in the same neighborhood that do not yield a yearly profit of $5, but it is the fault of the farmer and not of the land. The man who loiters along and lets things take care of themselves is sadly fooled when it comes to running an irrigated farm.

Lands on which peaches may be grown year after year are extremely scarce in the world. The Elberta is often as fitful as a pretty maid—the only creation that has ever been deemed equal in comparison with it. Elsewhere a peach year comes but now and then. In the Colorado peach belt, however, every year is a peach of a one and every man who is in the business can make all kinds of money by following it carefully. A prominent peach grower in Mesa county kept accurate account of expenditures and receipts on his large orchard for a term of five years. He received gross for his peach crops from $700 to $850 an acre a year, and his net profits

averaged a little more than $400 per acre per annum for the entire term. Such profits are not equaled in the banking business.

DRAINAGE.

Drainage, next to irrigation, is the most important subject confronting the fruit and vegetable growers of the South, leaving out the arid regions of West Texas, Arizona, New Mexico and Colorado, where irrigation is absolutely necessary to produce crops. In the semi-arid region of the South, if we had our choice between irrigation and drainage, we would prefer drainage to irrigation in the flat countries or coast countries of Louisiana and Texas. There are more crops lost by lack of drainage than by lack of irrigation during drouths. By constant cultivation and providing a dust mulch to retain the moisture a fair crop may be made by what is termed dry farming, but in floods, overflows during the heated period of the summer months the entire crop is lost either in the orchard or garden or most certainly diminished by excessive water on the land. It is fortunate that both irrigation and drainage may be secured by the same system; the ditches or canals instituted for irrigation during drought may be made useful during floods in carrying off the surplus water; also tile draining may be employed for the same purpose.

Drainage permits of earlier crops and a larger proportion of air, warmth and moisture in the soil. Drainage benefits the land also by affording a ready outlet for all excess of water, thereby preventing stagnation and removing a source of evil. The bad effects produced by an excess of water all of which are, of course, removed by draining—may be enumerated at length. One evil produced is the consequent diminution in the quantity of air within it, which air is of the greatest consequence, not only in promoting the chemical changes requisite for the preparation of food for plants, but likewise to the roots themselves. Excess of water injures the soil by diminishing its temperature in summer and increasing it in winter —a transportation of nature most hurtful to perenials, because the vigor of a plant in spring depends greatly upon the lowness of temperature to which it has been subjected during winter (within certain limits), as the difference of temperature between the winter and spring is the exciting cause of the ascent of the sap. The presence of a larger quantity of water in the soil also alters the result by putrefaction, by which some substances are formed which are useless in plants. An increase in the proportion of moisture in soils has a powerful effect upon its saline constituents, by which many changes are produced diametrically opposite to those that take place in soil where the water is much less in quantity; and in this way

the good effects of many valuable constituents are greatly diminished, as, for instance, the action of carbonic acid upon lime and green materials, and gypsum upon carbonate of ammonia.

The proportion of plant food available in the soil, for the use of crops, is largely influenced by draining and the amount of surplus water in the soil. The directions of the currents which occur in wet soils are entirely altered by drainage; in undrained soil the currents are altogether from below upward—being produced by the force of evaporation at the surface—consequently the spongholes of the plants are supplied with undesirable subsoil water; but when the land is drained the currents are from the surface to the drains, and the roots are, consequently, supplied with fresh aerated water. Drainage increases the absorption of carbonic acid, also the atmospheric supply of food, and creates a tendency in the plant to produce leaves possessing a different structure from those which the same plant produces in dry seasons. Another important point is that on land that has been drained the system of subsoiling can be adopted with ten-fold advantage, which is an object of the highest importance, for there is no doubt that the use of the subsoil plow has been satisfactory on almost all soils, having been found as valuable on light lands with retentive bottoms as upon those of a more compact and stiffer surface, rendering soils dryer in wet weather and more moist in dry weather. That a tenacious and impervious subsoil must be relieved from the water collected and retained on its surface before the earth can be fitted for the growth of vegetable matter has been most clearly and satisfactirily ascertained. The best mode of effecting this object may be a question, but it is probable that under-draining with tiles will be found the most economical method.

A cold soil is never capable of producing profitable crops. An excess of water in the soil, in addtion to its injury to the soil, also produces a constant dampness of the atmosphere, which has been shown to be injurious to plants, especially by diminishing evaporation, thus rendering the process of assimilation slower, and in some sectons and on certain farms malaria results; in fact, there is every reason to believe that surface water, which is for the most part stagnant, is by far the most injurious because in this manner the currents produced during the heat of summer—namely, the period at which vegetation should be the most active—will of necessity be entirely from below upward, being produced by the evaporation of the water upon the surface of the soil, the consequence being that the roots of the plants, instead of being supplied with water charged with valuable plant foods, will be supplied with water which has existed so long in the soil that it will have lost these vegetable ingredients, and will, more-

over, be charged with excrementitious matters. No system of drainage can diminish the quantity of water which a soil receives; it can only affect the quantity which it retains and prevent stagnation by allowing it to escape freely that continual currents are produced so long as any excess of water remains. Drainage will not fail to pay a percentage upon the cost far greater than many other investments, as that land will oftentimes require no manuring for years, the herbage, too, being of a peculiar different species from that hitherto produced, as well as being far more nutritrious.

TILE DRAINING.

Tile draining is the most perfect system of draining—a little more costly at the beginning, but of no expense or labor after the tiles have once been properly laid.

DRAINAGE ASSISTS PULVERIZATION.

It is manifest that a wet soil can never be pulverized. Plowing clayey, or even loamy soil when wet tends rather to press it together and render it less pervious to air and water. The first effect of underdraining is to dry the surface soil, and to draw out all the water that will run out of it, so that in early spring or in autumn it may be worked with the plow as advantageously as undrained lands in midsummer. In this

DRAINAGE LENGTHENS THE SEASON

for labor and vegetation. When a wet winter is succeeded, as it often is, by a torrid summer, without the ceremony of an intervening spring, farmer have need of all their energy to get their seed seasonably into the ground. The earth is saturated with water, and the land designed for cultivation frequent cannot be plowed until late in the spring, and all the processes are, necessarily, hurried and imperfect. We know, too, that in such ground the surface becomes hard and bakes quickly, so that it cannot be worked properly. This is not the case with drained land. Drainage

PREVENTS SURFACE WASHING.

All land which is not level, and is not in grass, is liable to great loss by heavy rains. If the land is already filled with water, or has not sufficient drainage, the rain cannot pass directly downward, but runs away upon the surface, carrying with it much of the soil, and washing out what remain of the valuable elements of fertility which have been applied

How many unsightly hills testify to this fact? If the land is properly drained the water falling from the clouds is at once absorbed and passes downward, saturating the soil in its descent, and carrying the soluble substances with it to the roots, and the surplus water runs away in the artificial channels provided by the drainage process. So great is the absorbent power of drained lands that, after a protracted drought, all the water of a heavy shower will be drunk up by the soil, so that in a day or two none will find its way to the drain, nor will it run upon the surface.

There are no open ditches on tiled land, and thus the unsightly appearance so common to many of our farms is avoided, and the ground thus occupied is used to the owner's profit and advantage. It is useless to more than refer to this matter, for the advantage of under drains over the usual ditch is too evident to warrant discussion. By using tile drains, though the drained land may be laid perfectly flat, we secure control of the whole field to divide and cultivate according to convenience, and making it of uniform texture and temperature.

DRAINED LAND IS LIGHTER TO WORK.

It is difficult to find one day in the year when a wet piece of land is in suitable condition to plow. Usually such tracts are unequal, some spots being wetter than others, because the water settles in the low places. In such fields the farmer drives his teams knee deep into the soft mud, and finds a stream of water following him in the furrow, or he rises upon a knoll baked hard and sun-cracked; and one-half of the surface, when finished, is shining with the plastered mud, ready to dry into the consistency of bricks, while the other is already in hard, dry lumps, like paving stones, and about as easily pulverized. This is hard work for the teams and men, hard in the plowing and hard through the whole rotation. The same field, well drained, is friable and porous, and uniform in texture. It may be well plowed and readily pulverized, if taken in hand and at any reasonable season. In this connection, attempts have been made to estimate the saving in the number of horses and men by drainage, and it is thought to be a reasonable calculation to fix it at one in four, or 25 per cent. It will probably strike any farmer as a fair estimate, that on land which needs drainage it will require four horses and four men to perform the same amount of cultivation that three men and three horses may perform on the same land well drained.

Drained land is least injured by cattle in feeding. A hard upland is less injured by feeding than a low meadow, and the latter less in a dry

than a wet season. By drainage, the surface water is taken from the field. None can stand upon its surface for a day after the rain ceases. The soil is compact, and the hoofs of cattle make little impression upon it, and the second or third crop may be fed off with comparatively little damage. Weeds are easily destroyed on drained land, and thus is removed one of our greater evils. If a weed be dug or pulled up from land that is wet and sticky, it is likely to strike root and grow again, because earth adheres to its roots where a stroke of the hoe entirely separates the weeds in friable soil from the earth and they die at once. Again, there are many noxious weeds, such as wild grasses, which thrive only on wet land, and which are difficult to exterminate, but which give no trouble after the land is lightened and sweetened by drainage. This alone will repay the entire cost of draining on some farms.

DRAINAGE PROMOTES ABSORPTION

of fertilizing substances from the air and supplies air to the roots. Plants, if they do not breathe like animals, require for their life almost the same constant supply of air. All plants die in soils and water destitute of oxygen. Absence of air acts exactly in the same manner as an excess of carbonic acid. Stagnant water on a marshy soil excludes air, but a renewal of water has the power to warm a wet soil and to facilitate aeration. Among the advantages therefore of thorough drainage is reckoned, by all, the circulation of air through the soil. No drop of water can run from the soil into a drain without its being supplied with air, unless there is more water to supply it; so that drainage in this way, manifestly promotes th permeation of air through the soil, and thus drainage

ADAPTS THE SOIL TO GERMINATION.

When water is added to perfectly dry soil, it, of course, in the first instance, fills the interstitial canals, and from these enters the pores of each particle; and if the supply of water be not too great the canals speedily become empty, so that the whole of the fluid is taken up by the pores; this to the healthy condition of the soil. If, however, the supply of water be too great, as is the case when a spring gains admission into the soil, or when the sinking of the fluid through the canals to a sufficient depth below the surface is prevented, it is clear that these also must get filled with water so soon as the pores have become saturated. This, then is the condition of undrained soil. Not only are these pores filled, but the interstitial canals are likewise full; and the consequence is that the whole process of the germination and growth of vegetable is materially

interfered with. The great effect of an excess of water is that it produces a corresponding diminution of the amount of air beneath the surface, which air is of the greatest possible consequence in the nutrition of plants; in fact, if entirely excluded, germination could not take place, and the seed sown would of course either decay or lie dormant. The perfect condition of the soil through drainage

AFFECTS ITS TEMPERATURE.

For example, pot-grown plants may still further serve to show a bad effect of a surcharge of water in the soil. All plant growers are very careful in cold weather about watering their plants at night, knowing by experience that the increased evaporation will too greatly reduce the temperature, and thus check and stunt the plant. The case is the same in effect over large areas where the water is held in the soil below the surface. The temperature is kept many degrees below what it would be if good drainage existed. Vegetation commences later in the spring, arrives at maturity later, and is coarser in texture on such soils. The market gardener, the fruit grower and the farmer cannot afford to raise crops on any but well drained lands.

The excess of water in soil keeps down its temperature in various ways, and the sun has not the power to warm such soil, for several reasons, among which are: 1. The soil is rendered cold by evaporation. 2. Heat will not pass downward in water, so that it can never warm the under soil, except so far as it is conducted downward by some other medium than water itself. 3. Heat being propagated in water only by circulation, anything which obstructs circulation prevents the passage of heat. Water when in the soil in quantity, in passing into the state of vapor rapidly carries off the heat which the soil has obtained from the sun's rays. It also carries off heat by evaporation and radiation when present in excess and in a stagnant state; while, on the other hand, stagnant water conveys no heat downward, giving back its heat to the atmosphere only, for although the surface is warmer, the heated water being lighter, remains floating on the surface, while the colder portion continues to sink until the whole has been lowered in temperature to its maximum density, 40 degrees. It is thus that soil overcharged with water is kept at a lower temperature than similar soil with natural or artificial drainage. When rain water can sink freely into soil to a depth of several feet, and then find ready exit by drainage, in such cases it carries down with it the heat which it has acquired from the atmosphere and sun-heated earth surface, and imparts it to the soil. This has been tested by numerous observa-

tions. The importance of the result cannot be well overrated, for although the temperature and other conditions of atmosphere, called climate, are beyond human control; this power of raising the temperature of all wet, and consequently cold, soils becomes tantamount in some of its results, to a power of improving the climate; there being good grounds for stating that in numerous cases grain crops have ripened ten or twelve days sooner than they would have done, had not the land on which they grew been drained. Drainage

IMPROVES THE QUALITY OF CROPS.

In dry seasons we frequently hear the farmer boast of the quality of his products. His hay crop, he says, is light, but will "spend" much better than the crop of a wet season; his potatoes are not large, but they are sound and mealy. Indeed, this topic need not be enlarged upon. Every farmer knows that his wheat and corn are heavier and more sound when grown upon land sufficiently drained.

DRAINAGE PREVENTS DROUGHT.

This proposition is somewhat startling at first view. How can draining land make it more moist? One would as soon think of watering land to make it dry. A drought is the enemy we all dread. Somebody has a plan for producing rain by extensive artificial fires and another by explosives in the air. A great objection to these arrangements is that they cannot limit their showers to particular land, and all the public may never be ready for a shower on the same day. If we can really protect land from drought by undermining it, everybody may at once engage in the work without offense to his neighbor. If a handful of rich soil, or almost any kind, be taken up after a heavy rain, we can squeeze it hard enough with the hand to press out drops of water. If a large quantity of the same soil should be taken up after it was so dry that not a drop of water could be pressed out by hand, and subjected to the pressure of machinery, we would force from it more water. Any boy who has watched the process of making cider with old-fashioned press, has seen the pomace, after it had once been pressed apparently dry and cut down, and the screw applied anew to the "cheese," give out quantities of juice. These facts illustrate first how much water may be hold in the soil by attraction. They show, again, that more water may be held by a pulverized soil than a compact one. This increased capacity to contain moisture by attraction is the greatest security against drought.

After more rain falls than the ground can readily absorb, the excess

settles into the drains and flows away, leaving the soil in a suitable condition for the roots of growing plants. But in dry time the air upon the surface is heated by the sun's rays that are absorbed by the top layer of the soil. This heated air expands and rises just as warm air rises from the heated stove. At the same time warm air enters the open ends of drain, passes along them and constantly ascends through the soil to take the place of the heated air rising from the surface. But all the soil below an inch or two of surface is cooler than the air that enters the pipes, and this being cooled, deposits its previously concealed vapor, so that, in fact, it moistens the ground.

We can thus understand why under-draining not only carries off excess water, but also dampens the soil when it is dry. Stirring a dry soil with hoes or cultivators in hot weather brings hot moisture-laden air in contact with soil colder than itself, and it deposits moisture upon it. Another important effect of such drains or air passages is that air passing through the soil oxidizes portions of the plant food in it, both mineral and organic, and thus increases the fertility. It also often destroys poisonous substances in the soil like the prosalt of iron, which the access of air changes into the innocuous peroxide.

Particularly does the foregoing apply to all clayey soil. There are occasionally stiff clayey soils, which are, in their natural state, impervious to water, or nearly so, and these are the very soils which without drainage are perfectly worthless. It would seem at first view that such soils could not, from their constitution, be susceptible of drainage, and were it not for a provision of Nature, which seems to specially aid our labors, such lands must be given over as hopeless. But all soils, and clays in particular, expand when wet and contract when dry. When drains are laid in clay the soil next to the tiles is deprived of its water, and, of course, rendered drier than the rest. This causes it to crack, and the cracks are found by observation to commence at the drains and extend further and further in almost straight lines, into the subsoil, forming minor drains or feeders, all leading to the tiles. These main fissures have numerous smaller ones diverging from them, so that the whole mass is divided and sub-divided into the smallest portions. The main fissures gradually enlarge as the dryness increases, and at the same time lengthen out, so that in a very dry season they may be traced the whole way between the drains. In addition to the evils enumerated it is well known that wet land, if in grass, produces the coarser varieties and many sub-aquatic plants and mosses of no value for pasturage; its herbage is late coming in the spring and fails early in the fall, and animals graz-

ing on it are unduly liable to disease. When such land is used for cultivation operations are easily interrupted by rain and the compactness and toughness of the soil renders labor more arduous than is necessary on dry lands. With all the usual precautions, the best seed time is often missed, and this usually proves the prelude to a scanty harvest. Even the breaking of the subsoil and the deep tillage so beneficial in other circumstances, is generally injurious on such land, as it but increases its power of retaining water. Doesn't every farmer know these to be facts? And yet, despite the testimony of the past and present, as well as the progressive spirit of late years in portions of our own and other countries, how true is it that underground drainage is almost unknown among our farmers of the South. The want of success with so many is attributed to "accidents," which, when examined, are found to result from causes that thorough drainage would certainly remove. It would seem from the remarks of those who till the earth that there never was a season just right, that rains had been sent down so plentifully and at such wrong seasons as to always blight our harvests. It is rare, it would appear, that we do not have "a most remarkable" season, with respect to moisture especially. Our potatoes, our corn, our cotton are rotted by the summer showers or cut off by a summer drought. No man admits that he lacked skill to cultivate his crop, and seldom does a farmer attribute his failure to the poverty of his soil. He has planted and cultivated in such a way that in a favorable season he would have reaped a fair reward for his toil; but, as has been claimed, the season unfortunately has been too wet or too dry. Still with full faith that farming will pay in the long run, our friend resolves to plant again, the same land in the same manner, hoping for the future, better luck that seldom comes. Too much cold water is at the bottom of most of these complaints of unpropitious seasons, as well as at the bottom of most of the soils, and the evils can only be removed, or at least lessened, by thorough drainage, by which as we trust we have shown, the stagnant water is removed to a proper depth, a free passage for rain water and air established from the surface to the level of the drain, thus speedily effecting most important changes in the condition of the soil, making it more friable and enabling plowing and other tillage operations to be more speedily performed; moderate rains cease to arrest such operations and heavy rains cause a much shorter interruption of such work. Deep tillage aids the drainage and is in every way beneficial, helping to make earlier seed time and finer harvest, better crops and healthier live stock and is a part of all judiciously conducted drainage operations. In

a word, we may estimate the profits of tile drainage at from 10 to 30 per cent, and sometimes the profits considerably exceed these figures. For every dollar's worth of improvements we put on our farms we must make a corresponding improvement in our methods of farming, and thus proportionately increase our harvests. When, then, we make our farms dry and drive our fields to the full limit of their productive capacity, we shall realize and reap the full measure of the profits of tile drainage and of improved agriculture.

DISTANCE AND DEPTH OF DRAINS.

What should be considered the minmum depth to which soil should be drained to obtain the greatest benefit therefrom, has been, and still is, a subject of considerable controversy. From what has been stated in the previous pages of this article, the proper depth should be nearly determined by any one who gives the matter necessary attention. Still, a few more thoughts may not be out of place.

Water runs steadily through sand or gravel. In such soils it easily seeks and finds its level. If it be drawn out at one point, it tends toward that point from all directions. In a free, open sand, you may draw all the water at one opening, almost as readily as from an open pond.

Yet, even such lands require draining. A body of sandy soil frequently lies not only upon clay, but in a basin, so that if the sand were removed a pond would remain. In such a case a few deep drains rightly placed would be sufficient. This however, is a case not often met with, though open, sandy soil upon clay is a common formation.

Then there is the other extreme of compact clay, through which water seems scarcely to percolate at all. Yet it has water in it, that may probably soak out by the same process by which it soaked in. Very few soils of even such as are called clay, are impervious to water, especially in the condition in which they are found in Nature. To render them impervious it is necessary to web and stir them up, or, as it is termed, puddle them. Any soil, so far as it has been weathered—that is, exposed to air, water and frost—is permeable to water to a greater or less degree; so that we may feel confident that the upper stratum of any soil, not constantly under water, will readily allow the water to pass through. And in considering the drainage of stiff clays, we have seen that the most obstinate clays are usually so affected by the operation of drainage that they crack and so open passages for the water to the drains. All gravels, black mud of swamps, and loamy soils of any kind, are readily drained.

The relations of the depth and distance of drains should be more fully considered in treating of the depth of drains. The idea that depth will

compensate for frequency in all cases seems now to be abandoned. It is conceded that clay soils, which readily absorb moisture, and yet are strongly retentive, cannot be drained with sufficient rapidity, or even thoroughness, by drains at any depth, unless they are also within certain distances.

In a porous soil, as a general rule, the deeper the drain the farther it will draw. The tendency of water is to lie level in the soil; but capillary attraction and mechanical obstructions offer constant resistance to this tendency. The farther water has to pass in the soil, the longer time, other things being equal, will be required for the passage. Therefore, although a single deep drain might in ten days draw the water all down to its own level, yet it is quite evident that two drains might do the work in less time —possibly in five days. Yet, if we adopt the conclusion that four feet is the least allowable depth; where an outfall can be found, there may be the question still, whether, in very open soils, a still greater depth may not be expedient, to be compensated by an increased distance. The sudden rising of water in many of our streams, with the attending overflow of much of our best land, so liable to occur about planting time, required that our system of drainage should be efficient, not only to take off large quantities of water, but to take them off in a very short time. How rapidly water may be expected to pass off by drainage is not made clear by writers on this subject. Probably three-inch tile, at fifty feet distances will carry off with all desirable rapidity, any quantity of water that will ever fall, if the soil be such that the water can pass through it to the distance necessary to find the drains; but it is equally probable that, in a compact soil, fifty feet distance is quite too great for sufficiently rapid drainage, because the water cannot get to the drains with sufficient rapidity.

While we would not lay down an arbitrary arrangement for any farm, and while we would by no means advocate what has been called the grid-iron system of drain everywhere at equal depths and distances, yet some system is absolutely essential, in any operation that approaches to thorough drainage.

The depth of, and distance between laterals, should be governed by the nature of the soil, whether clay, gravel or sand. If the main is six inches in diameter and laterals three inches in clay soil, let the laterals be thirty to forty feet apart. Laterals should enter the mains at an angle of from fifteen to twenty degrees, and thus avoid the obstructions liable to gather at the connection where a short bend is used. Six inches fall in each 100 feet is sufficient, if care is taken to have the greater fall at the lower end, or outlet, to prevent obstruction. The expense of draining is difficult to determine, for, naturally, it also depends on the soil and cir-

cumstances. In ordinary cultivated fields a great deal of the work can be done with the plow, and the filling in, after carefully laying the tile, can be done with scrapers.

If it be only desired to cut off some particular springs, or to assist Nature in some ravine or basin, a deep drain here and there may be expedient; but when any considerable surface is to be drained, there can be no good work without a connected plan of operations. Mains must be laid from the outfall, through the lowest parts; and into the mains the smaller ones must be conducted, upon such a system as to insure proper fall throughout, and that the whole field shall be embraced.

Again a perfect plan of the complete work, accurately drawn on paper, should always be preserved for future reference. Now it is manifest that it is impossible to lay out a given field, with proper mains and small drains, dividing the fall as equally as practicable between the different parts of an undulating field, preserving a system throughout by which, with the aid of a plan, any drain may at any time be traced, without making distances conform somewhat to the system of the whole.

In conclusion as to distances, I would advise great caution on the part of beginnners in laying out their drains. Draining is too important and expensive a work to be carelessly or unskillfully done. A mistake in locating too far apart brings a failure to accomplish the end in view. A mistake in placing them too near involves loss of time and money. Consult, then, those whose experience has given them knowledge, and pay to a professional engineer, or some other skilled person, a small amount for aid, which will probably save ten times as much in the end.

Now let us consider the necessary size of tile to use under various conditions. It is shown statistically that the maximum rainfall per hour is about one inch. One inch of rainfall per hour gives 22,633 gallons per hour for each acre, or 377 gallons per minute per square acre.

It is proven, also, that owing to obstructions not over 50 to 75 per cent of the rain falling will reach the drain within the same hour. Due allowance should be made for this fact in determining the size of tile required, as severe storms are generally of short duration. Remembering these points, the following table showing the number of gallons discharged per minute for specific sizes and grades of tile, will assist in determining the size of pipe to be used in the work.

CARRYING CAPACITY—GALLONS PER MINUTE.

Diameter of Tile in inches	1½ in. fall per 100 ft.	3 in. fall per 100 ft.	6 in. fall per 100 ft.	9 in. fall per 100 ft.	1 foot fall per 100 ft.	18 in. fall per 100 ft.	2 ft. fall per 100 ft.	3 ft. fall per 100 ft.
2½	14	20	28	34	40	49	55	68
3	21	30	42	52	60	74	85	104
4	36	52	76	92	108	132	148	184
5	54	78	111	134	159	192	219	269
6	84	120	169	206	240	294	338	414
8	144	208	304	368	432	528	592	736
9	232	330	470	570	660	810	930	1140
10	267	378	563	655	803	926	1340	1613
12	470	680	960	1160	1360	1670	1920	2350
15	830	1180	1680	2040	2370	2920	3340	4100
18	1300	1850	2630	3200	3740	4600	5270	6470
20	1760	2450	3450	4180	4860	5980	6850	8410
24	3000	4112	5871	7202	8303	10021	11743	14466

TOOLS AND IMPLEMENTS.

The implements convenient for drainage depend on many circumstances. They depend upon the character of the earth to be moved. A sharp, light spade, which may work rapidly and well in a light loam or sand, may be entirely unfit to drive into a stiff clay; and the fancy bottoming tools which may cut a soft clay or sand in nicely measured slices, will be found quite delicate for a hard-pan or gravel, where the pickaxe alone can open a passage.

One man works best with a long-handled spade, another prefers a short handle; one drives it in the earth with the right foot, another with the left. A laboring man in general works best with such tools as he is accustomed to handle; while theorizing implement makers, working out their patterns by the light of reason, may produce such a tool as a man ought to work with, without adapting it at all to the capacity or taste of the laborer. A man should be measured for his tools, as much as for his garments, and not be expected to fit himself to another's notions more than to another's coat.

If the land owner proposes to act as his own engineer the first instrument he will want to use is a spirit level, or some other contrivance by which he may ascertain the variations of the surface of his field. The natural way for a Yankee to get at the grades is to guess at them, and this practically is what is usually done. Ditches are opened where there appears to be a descent; and if there is water running, the rise is estimated

by its current; and if there is no water rising in the drain, a bucketful is occasionally put in to guide the laborer in his work. No one who has not tested the accuracy, or rather inaccuracy, of his judgment as to levels of fields can at all appreciate the deceitfulness of appearances on this point. The human eye will see straight, but it will not see level without a guide. It forms conclusions by comparisons; and the lines of upland, of forest tops and of distant hills all conspire to confuse the judgment, so that it is quite common for a brook to appear to the eye to run up hill, even when it has a quick current.

And so it is as to the regular inclination of the bottoms of drains. It is desirable not only to have an inclination as nearly as possible, especially if the descent be small. Workmen are very apt to work at a uniform depth from the surface line; and thus at one point there may be a fall of one inch in a rod, at another twice that fall, and at another a dead level or even hollow. We have found in twelve rods a variation of a foot in the bottom line of a drain opened by skillful workmen on a nearly level field, where they had no water to guide them, and where they had supposed their fall was regular throughout.

The following device has proved so satisfactory in an experience of several years that it is now thought to be almost indispensable. Two strips of pine board or other light wood about seven feet long and two and one-half to three inches wide, are joined by a small carriage bolt placed about six inches from the upper end, and forming shears as represented. The lower end of these strips should be square so that they will not readily settle into the ground when pressed from above.

The line, which should be small and strong like a mason's line, passing over the fork at the upper end of the shears, should be wound once around one of the arms to prevent slipping, and then fastened to a peg driven in the ground some six feet from the foot of the shears and nearly in line of the ditch. If the peg is driven nearer the foot of the shears than the height of the line above the ground, the strain will be greater on that part of the line between the top of the shears and the ground than it is between the shears, and the line will be liable to be broken near the end when subjected to the necessary tension.

The smaller the line the better, if it has the required strength, as it is less liable to sag between the shears. To prevent the line from sagging when the shears are quite a distance apart, "gage stakes" of the form to be described, are placed at convenient intervals along the ditch between the shears. A round rod of hard wood, about seven feet long and one and one-half inches in diameter (a long fork handle will answer), forms

the vertical part of the gage. This rod should have a sharp point at the lower end (which can be readily made from a piece of gas pipe), and an iron band at the upper end to prevent splitting when driven into the ground. The horizontal arm, about two feet lonng, should be 2x2½ inches at the end through which the vertical rod passes, and tapering, for the sake of lightness, to three-fourths of an inch square at the opposite end. A rivet should be put through the base of the arm, back of the key, to prevent splitting. The vertical rod is driven into the ground near the edge of the ditch, and the horizontal arm is slid up until the sag of the line is corrected, when it is secured by the key, which clamps it to the rod.

In laying tile from three to four feet deep my practice has been to adjust the line seven feet above and parallel to the desired grade, and then to make use of a seven-foot measuring staff to determine the depth of excavation required below the line. If the ditches are deeper the line can be placed higher and a longer measuring staff used to correspond to the increased height. When working with a seven foot staff, if all but the last foot of the excavation is made before the line is put up it will not be in the way, as it is high enough to allow a man to work when standing in the ditch.

EFFECT OF DRAINAGE.

The effects of drainage upon the soil are very plain and important. The roots of the plants in the undrained soil are confined near the surface, cut off by the water line, the plant yellows and dwarfs. The root of the plant in the drained soil run down, and spread out in search of supplies, hence the vigorous growth.

That a deep soil is better than a shallow one is well known to every observing farmer. We say of certain fields "the soil is thin," by which we mean that the field has a shallow feeding ground, for the roots of our crops will not grow in the water. Then a deep soil is better than a shallow one because the roots descend much deeper for plant food. In retentive clay soils we can have a depth of active soil as deep as we drain. Corn roots have been found at a depth of eight feet and wheat roots at a depth of five feet.

A drained soil becomes a great laboratory in which is prepared the necessary supply of food for the growing crop down as deep as the tile is laid. The water passing down through the pores to the drain below is followed by the air absorbed by the soil, which the roots, following down through the same spaces, take up.

DRAINAGE INSURES CERTAINTY OF CROPS.

The cultivator of level undrained land is continually harassed in mind about the uncertainty of his business. He must wait until the season is well advanced to plow his land. Then if he plants, he is uncertain whether the weather will be favorable or unfavorable. It may "turn off wet" and the constant evaporation, keeping the land cold, causes the seed to rot. If the season be favorable for the germination of the seed, and the young and tender plants appear, then it may turn off showery, and the land becomes so wet as to place it out of his power to cultivate it, and the crop turns out badly; or if the season be dry in the after part, the land which is naturally wet will dry out and become hard and the crops damaged. Hence it is that such a farmer must plod along on uncertainties, accept his fate and blame Providence.

But the farmer who cultivates land which is thoroughly underdrained can break it a week or ten days earlier in the spring; the soil is loose and friable; and he can plant fully ten days earlier with a positive certainty that the seed, if good, will germinate; he can cultivate sooner, and with a third less labor to both man and beast; can be stirring the soil in twenty-four hours after a heavy rainfall. The soil is warmer, and promotes the more rapid growth of the crop, and is less liable to damage from late frosts in spring, or early frosts in autumn, practically lengthening the season for growth and maturity fully thirty days, or if the weather should be dry, the roots descending deep into the earth bring up moisture from below, producing an abundant yield. Whether the season be wet or dry, the farmer on drained land has a certainty of an abundant yield which enables him to mature his plants without liability of failure. The experience of the past seasons of extreme drought in some localities has fully demonstrated the fact that the drainage protects against damage from this cause.

PRACTICAL SUGGESTIONS.

In the beginning of the work it should be carefully laid out, the inclination marked on grade stakes, and the whole should be platted and carefully preserved for future reference. If it is not possible to complete the work soon, let it be done so as to look forward to the time when it is completed.

In laying the drain, it is well to strictly adhere to the following rules:

1. The drain should have a sufficient outlet for the discharge of the water that may pass through it.

2. The drain should be deep enough to drain the widest space possible

from three or four feet and deeper if necessary, to get the water out by a much shorter line, but drain any way, even if you cannot get outlet to drain so deep.

3. The bottom of the drain should be one regular line of descent, so that the current may have a smooth flow from the head to the mouth of the drain.

4. Every tile should be perfect in form and burned, having a clear metallic ring.

5. In laying the tile, take pains to fit the joints closely, as with all care there will be sufficient space for the inlet of the water, and close joints will prevent the letting in of silt of washings.

6. At the junction of the drains, the water should be brought together, flowing as nearly as possible in the same direction, so that the flow of the current may not be obstructed.

7. The size of the tile may be pretty accurately determined by the amount of surface to be drained and the descent of the drain.

8. At the point where the work ceases for the time, secure and note the same, that the work may be readily taken up at any time.

9. If the drains be laid at a distance of forty feet apart, sixty-four rods of tile are required to lay one acre; if at a distance of fifty feet apart, fifty-two rods and a fraction will be required, and at a distance of sixty feet apart, forty-four rods.

WHEN LAYING DRAIN TILE REMEMBER

1. To begin the work at the lowest end or outfall.

2. Start deep enough to drain your whole field.

3. To get all the fall possible.

4. To dig your ditch straight. No curves should be allowed in the straight pipe. When they are necessary, use fittings specially made for the purpose.

5. To lay the tile straight. This can be done by using a taut string as a guide and placing the pipe under it.

6. To lay the tile so that every piece has the same fall. In other words, the whole line should have a true alignment and regular grade. This is important.

7. To pack lightly a little dirt alongside of each tile to hold it in place before filling the ditch.

8. To be careful to place the tile tightly against the one preceding. Don't try to leave space between the tile for the water to get in. It will always find a way.

9. To cover the joints with grass, weeds or paper, to prevent the dirt entering before the soil is packed tightly.

10. To fill up ditches carefully and note results.

COST OF TILING PER ACRE.

It would be a difficult matter to give the exact cost of tiling per acre, because some land needs more tiling than others. It is more expensive to lay tiling on heavy clay lands than light, porous soils. The cost of tiling also differs in various localities, on account of freight charges or long hauls. It is only possible to state that tiling may cost from $10.00 to $30.00 per acre, but no matter what the price or cost of land may be, in point of productiveness one acre properly tiled is worth two untiled.

FERTILIZERS.

The importance of fertilizers in the Southern garden or orchard plays such an important part that this entire book would be of little practical value were we to omit a full and concise description of fertilizers as auxiliaries to promote vegetable growth. While all plants derive nutrition from moisture and atmosphere to a limited extent, just as soon as the nutrition from the seed is exhausted and the plant forms roots, it is thrown upon its own resources, and its ability to find further nutrition in the soil in which it is planted. The soil itself is not a fertilizer; it is only valuable because it provides a place of rest to the plant, and absorbs and holds moisture and fertilizing elements, and by the plow and cultivators these elements, assisted by the moisture of rains, sun's rays or even freezing, are converted into plant food and assimilated by the plants. These facts are plain to the culturist, who has readily observed that thorough preparation of the soil and cultivation means always increased crops. In naturally rich and alluvial soils for a number of years cultivation would be about all required to produce maximum crops, but there are poor soils, worn-out soils; there are products that require a great deal more nutriment than others; there are even crops which improve the soil (leguminous crops), and where the soil lacks the proper amount of nutriments required for a certain crop the deficienc must be applied with stable manure, or what is termed artificial or commercial fertilizers. In Parts 2 and 3 of this book we give complete directions for just what kind of fertilizer and how much per acre to apply for each fruit and vegetable grown in the South.

FERTILIZERS AND THEIR SOURCES.

The various artificial manures, called fertilizers, have come into general use since the year 1840. In that year the famous German chemist Baron von Liebig, published his epoch-making book on agricultural chemistry. Every farmer should bear in mind the principles underlying the use of commercial fertilizers, which were first defined by Liebig, as follows:

1. "A soil can be termed fertile only when it contains all the materials requisite for the nutrition of plants in the required quantity and in the proper form.

2. "With every crop a part of these ingredients is removed. A part of this part is added against from the inexhaustible store of the atmosphere; another part, however, is lost forever if not replaced by man.

3. "The fertility of the soil remains unchanged if all the ingredients of the crop are given back to the land. Such a restitution is effected by manure. (It may be stated that there is some loss due to leaching and a change of availability of food applied.)

4. "The manure produced in the course of husbandry is not sufficient to maintain permanently the fertility of a farm. It lacks the constituents which are annually exported in the shape of grain, hay, milk and live stock."

Practical experience has proved that, as a rule, nitrogen, phosphoric acid and potash are the substances most needed to be applied to soils, to make or to keep them fertile, and that many soils are improved by the mere addition of lime. In conjunction with these elements, soils must contain a certain amount of humus or decayed organic matter, to maintain them in a proper mechanical condition.

NITROGEN.

Nitrogen is necessary for the production of protoplasm (the physical basis of life). Without it there can be no plant growth; it is a powerful stimulant, and, when present in excess, causes a rapid and excessive, but watery and unnatural growth, which is made at the expense of fruitfulness. Too much nitrogen on wheat shows its ill-effects in such a rank growth of the plant, and, later, of straw, as to be unable to sustain its excessive weight until the grain is matured; on cotton, by great growth of plant and but few blossoms, which mature fewer bolls; on fruit trees by a rapid and sappy growth which produces little fruit.

Leguminous crops (such as clover, beans, peas, etc.) draw their supply of nitrogen from the air, and, therefore, an artificial application of nitrogen fertilizer to this class of plants is rarely needed.

The more common sources of nitrogen in commercial fertilizers are nitrate of soda, cotton seed meal, sulphate of ammonia, dried blood and tankage. Fish scrap, castor pomace and other materials are also used.

The nitrogen in nitrate of soda and sulphate of ammonia acts a little more quickly than that in dried blood, tankage and the organic substances. Being easily soluble, it is best to use nitrate of soda as top dressing at time of planting, or in case of wheat, when active growth begins in April —other nitrogeneous fertilizers may safely be applied at time of planting—the nitrogen will become available as it is needed by the growing plant.

PHOSPHORIC ACID.

Phosphoric acid is necessary for the healthy growth of plants, and is essential to the best production of straw and seed. Its deficiency in a soil is shown by the want of vigor in its plant life. To produce its full effect, however, it must be used on a soil already rich in nitrogen, or be associated with nitrogen in the fertilizer; otherwise it will produce a tall, pale and spindling growth of straw with very small increase of grain or fruit. It has a marked effect in hastening maturity and should be used freely on all crops which it is desired to ripen early.

The principal commercial sources of phosphoric acid are raw, phosphate rock, acid phosphate, or dissolved phosphate rock, dissolved bone black, bone meal, dissolved bone and Thomas slag. In ground phosphate rock, or floats and bone black, the phosphoric acid is insoluble or unavailable, so that these materials produce effects very slowly. They are used occasionally for composts, but cannot be recommended for direct application to the soil. Bone black and raw phosphates are treated with sulphuric acid, which renders the phosphoric acid soluble, and the material is then known under the general name of superphosphate, or acid phosphate. All phosphoric acid, when once available, is of equal value; phosphoric acid in dissolved rock to that from dissolved bone, and there is no difference as to value on account of the source from which it is derived.

POTASH.

Potash is found in large quantities in all plants. It is essential to the production of starch fiber and the growing parts of the plant; without it there cannot be full development of plant or seed. In combination with nitrogen and phosphoric acid, potash contributes to the full and perfect development of plants. Excess of potash does not show any special effect on the plant, but a weakened growth, a lack of fruitfulness, and especially

a slow and unsatisfactory development of starch and woody fiber follows its deficiency in the soil.

The greatest potash supply in the world is found at Strassfurt, Germany, where soluble potash salts are mined in large quantities. Muriate of potash is the cheapest form of potash, but not best suited for certain crops, like tobacco and oranges. Then sulphate of potash, or the sulphate of potash and magnesia, should be used. Kainit is another potash salt containing chlorine, and is especially valuable for use on sandy soils, not only for its fertilizing qualities, but also for its peculiar property of retaining moisture, and its power of destroying insect life and preventing plant diseases, such as cotton blight. It is valued highly on the cotton lands of the South.

Wood ashes are also a valuable source of potash, though the amount contained is small and variable. Ashes made on the place should be kept dry and used on the heavier soils. When potash must be purchased it is less expensive in the German salts than in ashes.

One fact, clearly demonstrated by the work of the experiment stations, is that "soda cannot take the place of potash as a form of plant food." Plants cannot grow without potash, but are indifferent to the presence of soda, indeed they can thrive in a soil which contains no soda at all. When potash is lacking, no amount of soda will produce growth.

Potash in the form of wood ashes and cottonseed hull ashes consists largely as carbonate of potash. Carbonate of potash is useful as plant food, but cannot safely be mixed with organic nitrogenous fertilizer materials, as this form of potash rapidly decomposes organic maters, accompanied by more or less loss of ammonia.

LIME.

Lime improves the condition of swampy and peaty soils, which consist largely of humus and are consequently rich in nitrogen, but this nitrogen is unavailable, owing to the slow decay of the humus in some of these soils, so lime furnishes the conditions necessary for a more rapid decay. Such soils sometimes need phosphoric acid and potash as well as lime.

Lime also performs a valueable office in the sweetening of soils. When a soil betrays excess of acid, by turning blue litmus paper red, lime is needed. It also makes heavy clays light and more porous, and renders the plant food in them, as well as in muck, more available. Quicklime, marl and burnt oyster shells are the more common source of lime. To produce the results above noted quicklime from stone or oysters shells is more effective.

STABLE MANURE.

Barnyard or stable manure is often regarded by farmers as being a "complete fertilizer," and the only fertilizer needed on any soil. This is correct only so far as such manure contains all three of the fertilizing elements, but they are rarely found in the proportions needed by different crops. There is usually an excess of nitrogen and not enough phosphoric acid and potash. When stable manure is allowed to decompose by exposure to the weather, a large part of the nitrogen, its most valuable element of plant food, is lost in the form of ammonia. This loss, however, can be largely prevented by scattering Kainit over the surface of the manure as it accumulates, using about one pound per day for each cow or horse, or for each eight head of sheep. The Kainit will save more than its cost in the value of the nitrogen it prevents from escaping in the form of ammonia gas, and will still possess all its original value as a plant food. When stable manure is treated in this way, the addition of phosphoric acid will make it a complete fertilizer of the very highest quality.

WHAT FERTILIZERS TO USE.

The kind and amount of fertilizers which can be most economically used on a certain crop or on a certain soil, can be determined only by an actual test. No chemical analysis of either the soil or the plant will show this accurately. The kind of fertilizing needed will depend more upon the natural character of the soil, its previous treatment and its present mechanical condition, than upon the actual plant food taken up by the growing crop. The following suggestions as to the amount and composition of the fertilizers needed for different crops are based on the experience of experiment stations, and of successful farmers in different parts of the country. The figures here given represent the averages which have been found most profitable on ordinary soils in fair condition. The kind and amount of fertilizer required depend in a measure on the preceding crop. Thus the crop following clover or cow peas needs less nitrogen; while the one following the cereals, timothy, sorghum or millet, demands a liberal supply.

In nearly all cases, the amount of nitrogen needed depends on the kind of crop to be grown and what has preceded it; while the amounts of phosphoric acid and potash depend more on the natural character of the soil. In general a soil rich in lime needs little phosphoric acid, and is greatly improved by potash, both of which are essential to the production of plentiful crops. Phosphoric acid and potash are fairly permanent and when an excess is applied they remain in the soil, available as food for future crops

HOW TO MAKE HOME-MADE FERTILIZERS.

Every farmer, orchardist or vegetable grower should understand the true and economic value of home-made fertilizers. It is not always possible to obtain stable manure in sufficient quantities to supply the demand. The farmer, and especially the truck-grower, is forced to use what is termed commercial fertilizers; while these fertilizers supply, with their salts and acids, specific wants of plant life, they do not and cannot improve the land permanently. After the commercial fertilizers are applied and the crop harvested, the land is as poor as it was before, and even poorer, and in course of time will be so exhausted as to be unable to produce maximum crops.

In addition to the commercial fertilizers the land either requires rest in sod for a number of years, the plowing under of leguminous crops or the application of stable manures to supply *humus* to the soil. To circumvent this demand and to derive the greatest value from the accumulation of the barnyard manure it is advisable to establish the compost heap and add gradually such chemical manures to decompose the natural manures, to be more readily assimilated by the plant roots and also by the added strength supply a greater want, and at the same time add strength and *humus* to the crops at the same time. All accumulations of the farm, orchard and garden, such barnyard manures, chicken droppings, hog manures, night soils, leaf mold, muck, ashes, decayed wood, wheat or oats straw, and corn stalks all contribute and form the basis of the compost heap, and in the combination exists their greatest value, and particularly when commercial fertilizers, such as acid phosphate, is added to apply all of the wants of plant life. The application of this mixture not only insures one crop, but the effects will be noticed in several crops, and the improvement of the soil will be perceptible for a number of years.

COMPOST HEAP.

For the heap select any piece of ground near the barn and packing shed, dig a trench twelve feet wide, twenty feet long and three feet deep, throw the excavated dirt around the edges to form a bank to exclude surface water, erect posts and provide any cheap roof; if the roof leaks, all the better. Spread in the bottom manure, or some of all the ingredients mentioned above, two feet thick, and wet the same thoroughly. Over this scatter 100 pounds of acid phosphate, then with another layer of manure or offal and phosphate, until the supply is exhausted. Cover the whole with straw, old hay, leaves or any waste material. Be sure to wet all thoroughly. After the heap has stood from five to six weeks it should then

be worked over and mixed. This is best done by starting at one end and cutting it down, throwing the manure in a pile behind; cover again. It will be ready to use on the land in four weeks.

Three two-horse loads of this compost to the acre in the garden will show decidedly better results than twenty loads of common manure, and improve the land permanently for several years. While there are many recipes for home-made manures, there is nothing better or more economic than the above. A small shovelful of this compost applied to the hill for watermelons, cantaloupes, cucumbers, tomatoes, etc., will show some surprising results, as everything is there of nutrition to supply the plants, and bring them to the highest state of efficiency.

HOW TO USE COMMERCIAL FERTILIZERS.

From what has been said above, and since commercial fertilizers act in two ways, i. e., perform the double functions of supplying food direct to plants and of rendering available plant food already contained in the soil, their most economical use is as supplements to the home supply of manure. It is not possible to permanently improve a soil by the use of commercial fertilizers alone. In order to effect a permanent increase in the soil's productions, commercial fertilizers should always be used in connection with stable manure, green manuring and rotation of crops. By green manuring we mean that a crop of vegetable matter, preferably cow peas, should be turned into the soil at least once every two years. We should also be able to have our soil in the very best mechanical condition possible, and give the very best of cultivation. The question of the right amount of moisture is a very important one, for the best results cannot be obtained with either too much or too little.

The final question is, how and when to apply the fertilizer.

We recommend that where quantities of from 200 to 400 pounds are to be used, the fertilizer is best applied from a week to ten days before the time of planting. With these quantities apply as follows:

After the bed is thrown up, open same with a furrow down the center, being careful to open it at least one to two inches deeper than it is intended to put the seed. Distribute the fertilizr by hand or with a machine in this furrow, mix it with the soil, running a bull-tongue at least twice in the drill, then close the drill with a harrow and reopen for the seed, or drop with a planter, being careful that the seeds do not come in contact with the fertilizer. This mixing of the fertilizer with the soil and preventing direct contact with seed is very important. If the seed and fertilizer are in contact the vitality of the seed will be wholly or partially

destroyed and the result will be a poor stand. If the fertilizer is not mixed with the soil, the crop is apt to fire badly with the first dry spell. If larger quantities than those mentioned are to be used, then it is well to put one portion in the drill and at the first working bar off a light furrow on both sides and apply the balance, covering it with subsequent cultivation. Soils vary so much that it is not possible in a general article of this kind to tell just what mixtures to use. As a rule our farmers will find cottonseed meal and acid phosphate the best fertilizers, and unless large quantities are to be used, they had better mix these themselves. Very poor soils will do well with a mixture of two parts by weight of cottonseed meal and one part of acid phosphate for corn. The same soil would require equal parts of meal and acid phosphate for cotton. On better soils, especially soils that have grown cow peas the year previous, or to which stable manure has been recently applied, the latter mixture would do for corn, and then it would suit cotton were we to use two parts acid phosphate to one of cottonseed meal. On the richest soils very little nitrogen is required and three parts of phosphate to one of cottonseed meal would be right. An intelligent use of commercial fertilizers is very important. When used in this way they are a valuable aid to the farmer, and are a great factor in assisting him to fight the boll weevil, but it will not do to depend upon them alone. If this is done he soon pays the penalty in a failure of the crop. While soils do deteriorate when we depend upon commercial fertilizers alone, this deterioration is not so much due to their impoverishment by the action of the fertilizer as to the destruction of vegetable matter. A soil devoid of vegetable matter is unproductive, no matter how much plant food it may contain. Such soils are exceedingly subject to the effects of drought. Therefore in order to derive the greatest benefits from the use of commercial fertilizers it is necessary to use barnyard manures and green crop manures abundantly, with thorough tillage.

VALUABLE FERTILIZER ITEMS.

FERTILIZERS FOR IRISH POTATOES.

(By Prof. A. M. Soule.)

Irish potatoes may be cultivated successfully and profitably on a great variety of soils. Those who have had experience realize that with the labor saving machinery now available this crop can be grown and leave a fair margin of profit at a comparatively low sale price per bushel. One thing, however, is essential, namely, that good yields be obtained. In many in-

stances not over 100 bushels of marketable potatoes are grown per acre. Careful experiments show that from 300 to 500 bushels can be obtained, and that very heavy applications of commercial fertilizers will prove especially profitable on the Irish potato crop. Where a yield of 300 bushels of marketable tubers are obtained per acre a sale price of forty cents per bushel on the farm will leave the grower a larger margin of profit than he can obtain from many other crops which he is endeavoring to grow. Observation indicates that while a glut in the potato market may occur, the wide-awake, up-to-date grower of his crop who studies the situation carefully will one year with another obtain a fair reward for his industry. Potatoes require certain favorable conditions for this perfect development. A soil rich in humus is one of the conditions which must be provided for this crop. An old sod, clover preferred, turned under during the winter or early spring and thoroughly worked or cultivated until as fine as a garden provides the most favorable soil for this crop. Even heavy clays may be utilized successfully for the growth of Irish potatoes if they are abundantly supplied with vegetable matter. A loam, however, provides a naturally better soil, and light sandy soils, or those of a gravelly nature which drain well, can be brought into a condition favorable for the production of this crop by adding humus through the plowing under of green leguminous crops. The potato loves a moist soil, provided it is well drained, which explains in a measure why humus is so essential for the best results with this crop.

The attempt to grow Irish potatoes on soils well filled with vegetable matter will not be satisfactory unless there is a plentiful supply of available phosphorus and potassium in the soil. This explains why many farmers who frequently plow under clover or coat their land with farmyard manure look upon the cultivation of Irish potatoes as an unprofitable enterprise. As a matter of fact, they have supplied their land with an overabundance of one of the elements necessary for the production of this crop, but left it sadly deficient in the two others, which are just as necessary and just as important. This is a truth well worthy the earnest consideration of everyone who attempts to grow potatoes. For instance, a yield of 300 bushels of Irish potatoes per acre would take from the land fifty-one pounds of nitrogen, thirty pounds of phosphoric acid and 102 pounds of potash. This shows that the Irish potato is clearly a potash-loving crop, and those who have the best success in raising it have realized this very important point.

The culinary quality of the Irish potato is influenced very considerably by the soil and the fertilizers used in its production. On this account

sulphate of potash should be used on this crop, because it favors the development of a potato of excellent cooking qualities. Muriate of potash might be used but for the chlorine contained therein, which favors the development of a potato that is slick and more or less watery when cooked. The selection of the form of potash used is therefore a matter worthy of careful consideration on the part of the grower. As to the amounts to apply per acre on land that is well supplied with vegetable matter, a mixture of 750 pounds of high grade acid phosphate, 500 pounds of sulphate of potash and 750 pounds of dry earth will give a fertilizer containing 6 per cent of available phosphoric acid and 12½ per cent of potash. This mixture may be used at the rate of 500 to 1,500 pounds per acre with benefit and profit under most conditions. If desirable the amount of phosphates and potash can be increased or decreased by adding to or taking from the amount of acid phosphate or sulphate of potash mixed with a given amount of dry earth filler. In many soils there may be a deficiency of available nitrogen. In that instance a complete fertilizer may be used profitably. On lands well supplied with vegetable matter, where it is desirable to grow early potatoes, a quickly available nitrogenous manure will often be highly beneficial. On this account it will be important to know several complete fertilizer mixtures which may be used with satisfaction in the production of Irish potatoes. A mixture containing 3.7 per cent of nitrogen, 7.4 per cent of phosphoric acid and 9.4 per cent of potash may be made by using 850 pounds of 16 per cent acid phosphate, 600 pounds of cottonseed meal, 200 pounds of nitrate of soda, 350 lbs. of high grade sulphate of potash. A mixture containing 3.9 per cent of high grade nitrogen, 8 per cent of phosphoric acid and 10 per cent of potash may be made by mixing 1,000 lbs. of high grade acid phosphate, 400 lbs. high grade sulphate of potash and 600 lbs. of dried blood. A mixture containing 4 per cent of nitrogen, 6.2 per cent of phosphoric acid and 10 per cent of potash may be made by mixing 900 pounds of high grade acid phosphate, 500 pounds of dried fish scrap, 200 pounds of sulphate of ammonia and 400 pounds of sulphate of potash. These mixtures should be used at the rate of 600 to 1,000 pounds per acre.

TESTING FERTILIZERS.

Experiments have been conducted in the experiment orchard at the Massachusetts station since 1899, to test the relative effects of barnyard manure, wood ashes, bone meal and muriate of potash and bone meal and low grade sulphate of potash. In quantity of fruit plot, barnyard manure gave the largest return, while in cheapness of production and

in quality bone meal and sulphate of potash exceeded. Professor Brooks recommends the use of slowly available fertilizers in orchards, as these are obtained at less cost, with the same final results.

USE OF COMMERCIAL FERTILIZERS ON FARM.

(By F. W. Morse.)

It should always be borne in mind that the success of a crop depends on four other conditions besides that of the fertilizer used to feed it. All farm crops require certain average amounts of heat, light, air and water in order to develop an average growth, and just the right amount of each for the largest possible yield.

Thus weather conditions may favor or hinder a crop to such an extent that the fertilizer has apparently no effect, and these facts have led more than one to the conclusion that fertilizers were useless.

Fertilizers can not make good a lack of sunshine or rain, but they can help the sunshine and rain to do their best; therefore, when the weather is favorable they increase the profits and when it is unfavorable they lessen the losses.

The condition of the soil in its relation to air and water is of the greatest importance in the profitable use of commercial fertilizers. When a soil is too wet, it allows too little air to reach the roots of plants, simply because the water crows it out. In average seasons some soils are too wet and others are too dry for the following reasons: A crop of three tons of hay or one of fifteen tons of silage corn per acre would result in the removal from the soil of about 800 tons of water. To supply this water, there would need to be between seven and eight inches of rainfall during the growing season to each crop. At Durham, the average rainfall in April, May and June is 9.5 inches, and during May, June, July and August it is 12.8 inches. If this rain were uniformly distributed, it would be fully enough for grass and a little too much for corn.

On soils of average texture the requisite moisture conditions can be maintained by tillage, and if needed, by drainage on low levels, but with extreme types, as heavy clay loams or light sandy loams, there is needed more thorough treatment by increasing the amount of vegetable matter, since there is no more effective way of making over a soil in its relation to water and air than this.

In using the commercial fertilizers as a source of the food elements needed by crops, it should be remembered that there is little positive evidence that they can make over the soil in its relation to water, hence

they always do their best work and are most profitable on soils which are in good average condition, neither too heavy and wet nor too light and dry. Furthermore, the continuous growth of annual crops, whether hoed or broadcast, adds no vegetable matter to the soil, except in the roots and stubble, and it is common to find that the first crop of corn on sod land, with commercial fertilizers, is superior to that of the second year, undoubtedly because the vegetable matter of the old turf helped maintain a satisfactory moisture condition in the first year and was largely destroyed before the second year.

The most economcial use of commercial fertilizers is only reached when they are applied in rotations in which the soil is maintained in good moisture condition by the use of barnyard manure or the vegetable matter from crops grown for the purpose.

Although the food elements in a commercial fertilizer form but one of the several conditions needed for the best developments of the crop, it is important that these elements should be suited to the demands of the crop at every stage of its growth, else the product will not be as large as the other conditions would permit. It is the most common practice to use this class of fertilizers with the annual crop, and there are good reasons for such practice, as shown by fertilizer experiments.

WOOD ASHES FOR FRUIT PLANTATIONS.

Where wood ashes can be obtained they will usually be found to be of considerable value as a source of potash and phosphoric acid. They are especially good on the strawberry patch, if used in moderate quantities. Their value will depend on a number of things, chief of which is the kind of wood of which they were made. Some trees have only five or six per cent of potash in the ash, while trees like the elm are very rich in potash, the ash being sometimes as high as 25 per cent in potash. One ton of wood ashes would contain not less than 100 pounds of potash, which at five cents per pound is worth $5.00, while the phosphorus it contains should be worth in the neighborhood of another dollar. This makes a value of $6.00 for the ton of ashes. This, of course, applies to unleached ashes. Leaching very materially decreases the value of ashes, as it removes a large proportion of the potash. Ashes also contain lime, which is of value on many soils.

NITRATE OF SODA FOR POTATOES.

College Station, Texas.—In the spring of 1906 sufficient nitrate of soda for one-half acre of potatoes was sent out to several potato growers

who had agreed to follow directions and report results. The nitrate of soda was to be added as a top dressing after the potatoes were up. The following results were reported: A grower from Van Zandt county reports the yield of nitrate of soda and 400 pounds of potato fertilizer at 100 bushels per acre; the potato fertilizer without the nitrate of soda seventy-five bushels, showing a gain of twenty-five bushels per acre for the nitrate of soda. The nitrate of soda appears to have little value unless used in connection with a complete fertilizer. Grower No. 2, also of Van Zandt county, reports that nitrate of soda caused a very vigorous growth, the plants were very dark green and continued so up to the time of digging. He was, however, unable to tell any difference in the yield of potatoes with and without nitrate of soda. A potato fertilizer was used by this grower also. Grower No. 3 of Grapeland, Texas, reports that a hail damaged the crop. He compared the nitrate of soda with 150 pounds of cottonseed meal and did not observe any difference in the yield. The nitrate of soda appears to have a value equal to 150 pounds of cottonseed meal. Grower No. 4 of DeWitt county reports that the results were good. The yield was at least one-third more. G. S. T.

LIME AS A FERTILIZER.

While the use of lime in soil culture is a very ancient practice, and in past ages has ordinarily been commended, the methods of its actions in the soil have been, only recently, quite accurately determined.

These are helpful, first, mechanically, on soils that are made thereby more friable, admitting air and water and reducing by abrasion more completely.

Its action chemically is less obvious, varied and usually favorable to the release of plant food—plant growth. The sundry combinations in Nature's laboratory are often a justification of the kiln-burner, but as they are not always so the subject deserves very careful study.

To use lime not needed is burying money in a hole from which there may be no resurrection of the "one talent" or even of the "napkin" in which it was enveloped.

Lime is not a plant food; its material quality is distinctly called nonmanurial, a stimulant; its function, when helpful, is indirect; its action that of a reagent; new land, the recipient of vegetable decay, the dropping of leaf fall for countless ages, is very productive for a time. As it fails in fertility the humus left unexhausted by culture is often burned up by caustic lime and never afterward restored.

Such soil is declared "worn out." It is sterile, and lime is a finishing factor in the degredation.

We find human experience of the hurtful use of lime crystalized in Germany in the adage, "Lime makes the farmer richer and the farm poorer." Its English equivalent is "Lime enriches the father and impoverishes the sons."

Is the purchase of elemental fertility in practical proportions, as needed, a saner and safer practice than the attempt to accomplish the same good results with lime by a course of intricate chemical gymnastics, so indirect and uncertain, as possibly never to attain the end sought?

Think about it. The concensus of opinion among thoughtful cultivators of the soil, strongly urged by chemists who have given attention to this phase of the action of calcareous application is, that continued success with lime can only be assured by the use of other essential manurial substances in connection with it.

Lime may then impoverish soil; and as many of our important crops are injured by its use it is plain it is a dangerous element, which, though it is frankly admitted, we may not wisely discard altogether, we may, and should, only urge its use when the chance for good to come of it is clearly demonstrated.

On regular field crops grown here our local experiences are variant and inconclusive. They do not "advise" the use of lime, but are favorable enough to "suggest" its use.

There are two easy tests that go very far to prove the propriety of the use of lime, both of which should be tried before a kiln is built. The easy test for soil acidity is blue litmus paper. This buried in moist soil overnight will turn pink if too much acidity is found. Or if beets be planted in long rows with and without lime. If lime be needed the row on which it is used will respond to its presence very conclusively.

The indictment of lime then appears strong but qualified:

It is not a manure; it is a stimulant.

It cannot directly feed plants to an appreciable extent.

It destroys vegetable molds of fertile soils.

It is useless in soils devoid of decaying humus.

It costs money.

In its favor: it makes acid soils mildly alkaline, a condition favorable to better development of many plants, especially so to most of the legumes.

It helps the physical condition of some tough clays.

It is substituted for potash, making the insoluble silicates of potash available.

It is credited with developing the microscopic microbes that produce soluble nitrates, and this we accept as its greatest function in the problems of how to feed the human race.

But scientists argue that our treatment of the burned rock allows it to revert, by atmospheric absorption of carbonic acid gas, into the same insoluble form in which it was found in the unburned rocks. This is no doubt theoretically true, but as the process of relapse is not complete, its soluble and caustic quality is not lost altogether in this way. However, it is advised to slake the lime with water under cover of soil.

This last direction does not appear imperative (if desirable), for the reason that the heat developed in the slaking lime will for a time prevent absorption of carbonic acid gas, and the distribution may follow the slaking rather promptly. It should be used in the fall on wheat, followed by clover.

PART VI.

BENEFITS OF ORGANIZATION AMONG FRUIT AND TRUCK GROWERS AND POULTRY RAISERS IN THE SOUTH.

BENEFITS OF ORGANIZATION AMONG FRUIT AND TRUCK GROWERS.

There are so many advantages to be derived from organizing fruit and truck growers into permanent organization at any and every Southern shipping station that there is hardly any need to dwell at any length upon this important subject. Everyone familiar with the intricacies and difficulty of shipping perishable fruits and vegetables has readily observed that organization is almost a necessity to achieve success.

The social systematic meetings of the growers, the discussion of vital and interesting points about soils, fertilizers, different varieties of seeds, the proper harvesting of the products, packing and shipping, all contribute success to many, where one or a few might fail.

It has long ago been demonstrated where fruit and truck shipping has reached its highest state of perfection is where an association exists, and this fact alone is sufficient to encourage organization for protection and mutual profits.

By the increased acreage of the members, carloads may be loaded more promptly of any one product, and this will induce buyers to come, and attract them to loading stations, as they have more confidence where an organization with its officers, sales agents and inspectors is in working order, besides seeds, box material and fertilizers may be bought in larger quantities, even in carlots, and this means lower prices and better goods, for no one will so readily impose on a well-organized up-to-date fruit and truck growers' association, as on an isolated shipper.

An association having an inspector usually ships better goods, and the buyer and commission merchant readily understands this to be a fact, and will pay more attention to association shipments than he would to an individual spasmodic shipper, on whom he may depend on one day but not the next for the goods. The railroad companies, refrigerator and express companies always treat the affairs of a well-organized organization with more promptness and greater consideration; claim for overcharges, for damages by delay and decay are always more promptly settled, for "in union there is strength," and we observe this in every avenue of industry, so if there is one reason for organizing, we can easily find a dozen.

It might be said, whether a person succeeds or fails in truck growing depends not upon the intelligence of the individual in question entirely, but upon the average degree of intelligence in his community. If the people in a community are sensible enough to organize and market the

products of the truck farm intelligently, they will succeed; unless they do this they will fail. In the South it is no longer a question of producing, but entirely one of successfully disposing of that which is produced. Our experiment stations, assisted by specialists from the United States department of agriculture, and our Modern Guide, has succeeded in solving nearly all of the problems of production that were not solved by the growers themselves, and exact information concerning the proper method of producing any crop can be had for the asking. There is no longer the slightest excuse for crop failure from any other cause than unfavorable weather conditions. The question of selling the product of the truck farm is one that has not yet been answered to the entire satisfaction of the growers.

In considering the problem of how best to market the products of the fruit and truck farm, the first lesson the grower must learn is that the consumer at the other end of the line is entitled to every consideration; when they give their money to the dealer they want its equivalent in fresh, clean stock. They do not want to pay their money for badly-packed, poorly-assorted, under-ripe or over-ripe vegetables. And just as soon as they find that the stuff coming from any community is carelessly handled and dishonestly packed, they are going to quit buying it; the retail merchant will no longer buy it from the commission merchant or wholesale produce dealer, and the shipper will get hard luck stories instead of nice account sales and substantial checks. Shippers of vegetables are too much inclined to lay all the blame for their failure upon the other fellow, and too often use a telescope hunting for their troubles when they could see them with the naked eye if they were not blinded by prejudice.

Of course, it is very consoling to lay the blame upon the commission merchant, thus clearing ourselves from the charge of carelessness, and, in some cases, dishonesty. A good rule would be for the shipper to determine that he would not offer for sale that which he would not be willing to buy.

When the shipper has digested the above features and has determined to put up good, clean stock, properly graded and packed, he has taken the first and most important step in the successful solution of the market problem, but it does not end there. It is only the very early and high-priced product of the truck farm that can be profitably shipped in less than carload lots. The difference between the transportation rate by express and the transportation rate in carload lots by freight will make a very handsome profit of itself. Very few truck farmers in this state grow stuff in sufficient quantity to ship carload lots. In order to secure the advantages of carload rates each community should have an organization

to co-operate in marketing its truck crop, thus putting the small producer in position to do a wholesale business.

A truck growers' association in order to be successful must be organized as a business institution. It should be incorporated with a capital stock sufficient to make it financially responsible for the contracts it may enter into. Following the principle of giving full value for every dollar received, a truck growers' association that is known to be financially responsible for its contracts and managed by people whose standing for business integrity is above question, can always make track sales at good prices if any demand exists for that which they offer to the trade. A wholesale produce dealer does not care to purchase stock of this character from irresponsible people unless he has a representative on the ground to inspect the stock before it moves. But if they know the people with whom they are doing business are good, both morally and legally, they are willing to buy without seeing the stock.

In organizing a truck growers' association due care should be used in the selection of people who will administer its affairs, and it should be borne in mind that patriots willing to serve their country without compensation are few and far between, and, usually, persons make such propositions expecting to get something somewhere sometime. Therefore, it is wise to know just what they are going to start with, and to pay the employes of the association reasonable wages for the services rendered. It will pay an association well to hire the best man that can be had.

The Southwestern Onion Growers of Texas, with headquarters at San Antonio, Texas, pay their general manager eight thousand dollars a year to market their onions, and it has paid them to do it.

A step further in working out the market problem would be after each community had perfected its local organizations to have an association of organizations for the purpose of avoiding over-stocked markets and to bring about the proper distribution of products of various communities. Several attempts have been made in the South to do this, but so far none of them have succeeded, and the result is needless competition and frequent glutted markets. However, when one considers that the truck crop of the South is produced by some 400,000 people, each one having more or less original ideas about marketing that crop, the difficulty of bringing about such an organization will be understood. It is within the limits of the possible that effective state organizations will some day materialize.

Organization is also necessary for the reason that individual and separate action in marketing is so expensive that it consumes the profits. The

producer must ship in small lots at high express rates and must entrust the selling to commission merchants who are not always watchful of his interest or honest in making returns. Satisfactory results are obtained only when shipments from a community are large enough to make up car lots to warrant either the maintenance of direct representatives in the principal markets or the taking of daily telegraphic reports of conditions and prices in order to direct the supplies to the places where they are most in demand. Indeed, when truck growing becomes well established in a community the buyers go there and the farmer is relieved of all the details of shipping, because he sells his produce on the farm or at the railway station. Even then, however, organization is still necessary as a medium of information and co-operation, for the fruit and truck business requires quick information and action in order to obtain the best results, and these are practically impossible by the individual operating alone.

No part of the South has a monopoly of fruits and vegetables. The southern sections have an advantage in earliness, but there is a sufficient demand later for the northern sections to supply. The eastern sections are especially adapted to certain varieties of fruit, but other varieties will grow as well in the west, and nearly all the vegetables flourish equally in all sections of the South.

HOW TO ORGANIZE A FRUIT AND TRUCK GROWERS' ASSOCIATION.

The usual plan is for some interested and progressive citizens to issue a call through the medium of the local newspaper, or other means, to notify the community of the purposed meeting to be held at the court house, school house or any public place for the meeting, on a published date. When the meeting is assembled someone familiar with the subject may state the object of the meeting, select a chairman, and, after a few discussions on the object, proceed to elect a president, vice president, secretary and directors. The next order of things would be to adopt a constitution and by-laws, and, to assist the meeting, which would also consume much time, we publish below a constitution and by-laws which have proven very satisfactory in many associations in the South, such alteration or changes may be made to conform with the wishes of the members, also the question of incorporating or not should be thoroughly discussed.

CONSTITUTION AND BY-LAWS OF A TRUCK GROWERS' ASSOCIATION.

(Compiled by T. G. Thomas, Editor Southern Shippers Guide, Houston, Texas.)

PREAMBLE.

For the purpose of furthering the various truck-growing industries of our country, and the advancement of all other industries that may be incidentally connected therewith, we bind ourselves together under the title of.....Truck Growers' Association, and adopt the following:

CONSTITUTION.

ARTICLE I.

This association shall be known as "The.....Truck Growers' Association."

ARTICLE II.

All persons interested in the subject of truck growing may become members of this society by paying annually to the treasurer such sum as may be provided by the By-Laws of this society; provided, that all ladies may become members.

ARTICLE III.

Section 1. The officers of the society shall be a president, vice-president, secretary, treasurer and executive committee, consisting of five, of which the president and vice-president shall be ex-officio members.

Sec. 2. The president shall exercise a general superintendence over the affairs of the society; preside at all meetings of the same; draw all orders on the Treasurer as directed by the society; call meetings of the society or executive committee when deemed necessary; he shall be ex-officio president of the executive committee.

Sec. 3. The vice-president shall assist the president, and in his absence perform his duties, and be ex-officio member of the executive committee.

Sec. 4. The secretary shall keep full and complete minutes of the society and the proceedings of the executive committee. He shall receive and safely keep all books, periodicals, stationery, seeds and other like property of the society, subject to its order; shall correspond as may be necessary with all persons or societies, as the welfare of the society may de-

mand. He shall report all proceedings of the executive committee to the society at its first meeting thereafter. He shall countersign all orders drawn upon the treasurer by the president, under the direction of the society.

Sec. 5. The treasurer shall receive all moneys due to the society; shall keep a just and true account of the same, from what source received, and pay out the same upon the order of the president, countersigned by the secretary. At the annual meetings of the society on the first Saturday of August in each year (or oftener if required by the executive committee) he shall make a full and complete report of all receipts and disbursements, and at the expiration of his term of office turn over all books, papers and all money or other property belonging to the society to his successor in office. The executive committee may require the treasurer, before entering upon the discharge of the duties of his office, to enter into a bond, with sufficient security, to be approved by the president of the society, in such sum as the executive committee may deem necessary, conditioned for the faithful performance of the duties required of him in this section.

Sec. 6. The executive committee shall assist and advise the officers in the discharge of their duties, and do and perform such other duties as may be required of them by the By-Laws of the society.

Sec. 7. The vice-president shall collect data concerning the state of truck growing, and report same in person at each regular meeting of this society, and work up a more general interest in our society by securing more members thereto.

ARTICLE IV.

The officers of this society shall be elected by ballot or acclamation, as the president sees fit, from among its members, for the term of one year. The annual election shall be held at the regular meeting of the society on the first Saturday in August of each year, when the general business of the society shall be transacted. Vacancies may be filled at any meeting of the society.

ARTICLE V.

The regular meeting of this society shall be held on the first Saturday of each designated month, at 2 o'clock p. m., at such place as the society may select.

ARTICLE VI.

A majority of the members of the society shall constitute a quorum at any meeting, and three members of the executive committee are authorized to transact business at any meeting of the committee duly called.

Special meetings of the society or executive committee may be held by order of the president or any three of the executive committee on one week's notice to all members of the society or the board (as the case may be), given personally through the postoffice, or by posting at three different places, one of which shall be the court house door. Adjourned meetings may be held from time to time as the society may determine.

ARTICLE VII.

The funds of this society shall not be appropriated for any purpose without a vote of the members present at any regular meeting of the society.

ARTICLE VIII.

The society may have such standing committees as shall be provided for by the By-Laws.

ARTICLE IX.

This Constitution may be amended by a two-thirds vote of all the members of the society present at any regular meeting; provided, that notice of the intentional amendment shall have been given at least one month prior to any action taken thereon.

ARTICLE X.

The meetings of this society shall be governed by the parliamentary rules used in deliberative bodies.

ORDER OF BUSINESS.

1. Reading of minutes of last meeting.
2. Report of executive committee.
3. Report of standing committees.
4. Essays, or subjects for discussion.
5. Discussion.
6. Old business.
7. New business.
8. Report of special committees.
9. Adjournment.

BY-LAWS.

Section 1. All applications for membership must be accompanied by the membership fee, together with one year's dues, in advance; and the

membership fee is hereby fixed at fifty cents, and the annual dues at twenty-five cents.

Sec. 2. All discussion must be addressed to the president and must be confined to the question before the meeting.

Sec. 3. Any member desiring to address the meeting upon any question must first receive recognition from the chair; failing to do this he must resume his seat.

Sec. 4. Any member having voted upon any question with the majority may move its reconsideration.

Sec. 5. All questions, unless provided for in the Constitution and By-Laws, shall be decided by a majority vote of the members present.

Sec. 6. Every rule that may be adopted by this association shall remain in force until suspended by a two-thirds vote of the members present at any regular meeting.

Sec. 7. A motion to adjourn is always in order unless a motion is pending that must be decided without debate.

Sec. 8. Cushing's Manual shall be authority upon all questions not provided for in the Constitution and By-Laws.

PARLIAMENTARY LAW.

Every body assembled for the purpose of deliberation finds it necessary, both for its proper organization and to facilitate its proceedings, either to adopt special rules for the regulation of such proceedings or to act upon those which are generally accepted as the ordinary rules of parliamentary practice. The special rules which any assembly may form for its guidance and government supersede, in all points which they relate, the common parliamentary laws, leaving the latter in full force in all other respects.

The following is a synopsis of the generally accepted laws of parliamentary practice in the country:

ADJOURNMENT.

1. A motion to adjourn is always in order.
2. It is not debatable.
3. Cannot be amended, except there is no other business before the meeting.
4. Some proceeding must intervene before a second motion to adjourn can be entertained.

5. It stops, when carried, the further consideration at that time of any question which was pending when it was made.

6. The main question can be referred to in discussion, if the motion to adjourn involves its merits.

7. Reconsideration not allowed.

8. Cannot be entertained while anyone has the floor.

9. Adjournment to a particular time may be amended or reconsidered.

AMENDMENTS.

1. To be entertained, must be germane to the original motion, though they may be directly opposed to its intent.

2. Are debatable.

3. May be amended once.

4. May be reconsidered.

5. Are put before the main question.

AMENDMENT TO AMENDMENT.

1. Is debatable.

2. Cannot be further amended.

3. May be reconsidered.

4. Must be voted on before the first amendment or original motion.

5. Amendments may be surperseded by a motion to postpone or to commit.

Amendments are generally introduced when the assembly is satisfied with the subject-matter of the original motion, but dissatisfied with some of its parts, or with the form in which it is presented. But amendments are admissible which entirely alter the nature of the original proposition, from the fact that a motion, when once stated by the chair, is the property of the house, and it is the privilege of the assembly to alter it to any extent it may see fit.

They are sometimes adopted as a means of defeating the original motion, by extending its principle, and thus its absurdity so clearly that the house will not agree to it.

Sometimes the mover of the original proposition accepts the proposed amendment, and, if no one objects, the amendment is embraced in the original proposition, but if there is objection a motion is necessary to obtain the consent of the assembly; otherwise it must be put separately as an amendment. The mover, however, has a right to move an amendment to his own motion.

The manner in which propositions are generally amended is either by

striking out certain words, adding words, or by both striking out and inserting.

Amendments may be amended once, but no more. Thus, if a motion be made that A, B. C. D represent a certain thing, and an amendment be made to strike out D, which is further amended by a motion to strike out C, another amendment to strike out B would be in order. The question is taken first on the amendments. If the amendments be carried in the affirmative the question is then on the original proposition as amended. If the decision on the amendment be negative, the question recurs on the main proposition. If the decision on the second amendment be affirmative the first amendment must be put as amended, and so with the main question.

In putting a motion for striking out words, the parliamentary form is, "Shall the words stand as part of the main question?"

In case of the rejection of an amendment to insert certain words, a motion to insert the same words, or any part thereof, is not in order; but a motion to insert the same words with others is. Or, when a motion is carried to insert certain words, it will not be in order to move to strike out the same words, or a part of them, but a motion to strike out the same words with others is permissible.

When a motion is made to strike out certain words and to substitute others, any member may call for a division of the question. When a division is in order, action is first taken on the motion to strike out, which is put in the usual form, viz: "Shall the original motion stand?" And if the decision be in the negative the question is put on the insertion, which may also be amended. When a negative decision is given on a motion to strike out and insert without the question be divided it is not in order to have the same motion made again. If an affirmative decision be given on a motion to strike out and insert, it would not be in order to move to strike out the words inserted, or insert words struck out.

COMMITMENT.

1. Motion to commit may be debated.
2. Can be amended.
3. May be reconsidered.
4. Is not superseded by the previous question or postponement.
5. Has precedence of a motion to amend.

COMMITTEES.

Committees are usually of three kinds—special, standing, and of the

whole. A special committee is one selected for a particular purpose. A standing committee is one to which is referred all matters of a like nature, as the committee of ways and means; it is a permanent body. A committee of the whole is composed of all the members of the house.

The object of the committees is to facilitate business by dividing it among the members, which can thus be more readily accomplished than by the entire body giving their attention to the details of each particular subject.

Committees are sometimes given full powers and sometimes their authority is restricted, both depending on the instructions given out by the assembly. They are appointed by the chair of the house, and occasionally by ballot. When nominated by the house the names are voted on singly, and when by ballot they are chosen either singly or all together.

The mover and seconder of a motion to constitute a committee are generally by courtesy appointed to serve on it, and the person first named usually acts as its chairman, though every committee has a right to elect its own chairman, who makes the report to the meeting. A majority of the members of a committee is necessary for a quorum.

The committee may meet when and where it pleases, and adjourn from time to time as it sees fit, unless otherwise ordered by the assembly. In committee meeting the same parliamentary forms obtain as in the regular assembly, except in committee of the whole.

The chairman of the committee, in making the report, reads it to the meeting and delivers it and all papers connected therewith to the clerk or secretary. When the report has been read and accepted the committee is discharged, except the report be recommitted.

It is customary to put the question on the acceptance of the report without formality of a motion. The acceptance of a report is not to be confounded with its adoption, the latter being a matter afterwards to be considered by the assembly.

COMMITTEE OF THE WHOLE.

When it is resolved to go into committee of the whole the chairman of the assembly as a rule calls upon some member to act as chairman of the committee, and the secretary or clerk is appointed by the committee. The president of the assembly is supposed to remain in the committee till it rises or breaks up for want of a quorum, so as to be able to take the chair when the assembly is called to order.

The committee of the whole does not adjourn, it merely rises, and a motion that the committee "do now rise" is made when the labors of the

committee are ended. If not completed at one session the motion is "that the committee do now rise and ask leave to sit again."

The previous question is not allowed in committee of the whole, but members can speak as often as the chair will recognize them; and no business can be referred to a subordinate committee; neither can a member be punished or expelled for a breach of order, but must be reported to the assembly.

The chairman of the committee makes the report to the meeting, which is received and acted on in the same manner as the report of any other committee.

TO COMMIT.

A matter may be referred to a committee without instructions. Instructions, if given, must be followed; if none be given, the committee have full powers. This motion can be amended, and, if first made, is not superseded by the previous question or postponement. Recommit is the term applied when the matter has been once in the hands of a committee.

CHAIRMAN'S DECISION.

To appeal from:

1. Is debatable, cannot be amended, but may be reconsidered.
2. Is always in order, even when another has the floor.

DEBATE.

To close—Is not debatable, but may be amended or reconsidered.

To limit—Is not debatable, but may be amended or reconsidered.

Order of—The presiding officer cannot participate in debate. Should he wish to do so he must ask the vice-president or some other member to take the chair. From the chair he can only state general matters of fact within his knowledge and decide points of order.

The mover, as a rule if he rises to speak, is given the preference, and if two or more claim the floor it is customary to give the preference to one opposed to the motion. A member in resigning the floor to accommodate another, even for a moment, is not entitled to it again, though it is customary to concede it to him.

Members, in speaking, are not to refer to others by name, but to designate them as "the previous speaker," "the gentleman on my right or left," or in some such way as would indicate the party referred to.

Decorum in—Common decency, as well as general rules of order, requires that a member be accorded a courteous attention while speaking and that all hissing and unnecessary calling for the question and ironical cries

of "Hear, hear," are decidedly out of order. A person with any discernment can readily tell whether the assembly be inclined to listen to him, and if he find they be not, prudence would suggest that he resume his seat as soon as he consistently can without making too sudden collapse.

Should any member or members persist in disturbing the meeting after being called to order he may be called on by name by the chair to withdraw, and the assembly decides what action shall be taken. As a rule the efforts of the chair to preserve order are supported by the assembly, if not, the self-respecting chairman will vacate his position.

DIVISION OF A QUESTION.

When a motion is composed of two or more parts which are capable of being considered separately it is usual to amend the original motion by calling for a division of the question or by motion, regularly seconded, that the question be divided.

A party moving to divide a question should state how he desires the division made.

LAY ON THE TABLE.

1. Is not debatable.
2. Cannot be amended.
3. Supersedes all the other subsidiary motions.
4. Cannot be reconsidered when the vote is affirmative.

This motion supersedes all other subsidiary ones. It is used either to finally dispose of a matter or to lay it aside for an indefinite time. An affirmative decision removes all other motions from before the house; a negative allows business to proceed as before the motion was made. To renew debate on the subject tabled, a motion to "take the table" properly made and carried, opens the same question.

To take from the table—

1. Is not debatable, nor can it be amended.
2. A vote in the negative may be reconsidered.

MOTION.

1. Must, as a general rule, be seconded. The Massachusetts legislature does not now require a motion to be seconded.
2. Must be stated by the chair before they are open for discussion or amendment.
3. Principal and subsidiary motions cannot be made together.
4. Can only be withdrawn by consent of the house, after being stated.
5. Original motions may be superseded by motion "to table" a question of privilege, a question of order, to commit, or to amend.

6. Are not in order unless the maker is recognized by the chair.

Motions are propositions introduced by members. They are either principal or subsidiary.

Subsidiary motions relate to the original or principal motion, and are used to facilitate the disposal of the latter. The most common are—to lay on the table, for the previous question, to postpone, to commit, and to amend. (See notice of them under their respective heads.)

A motion after being properly made and seconded is then stated by the chair and discussion is in order, and no other motion can be received except a subsidiary one.

If there be several subsidiary motions in addition to the principal question before the house at the same time, the subsidiary motions are first settled in the order of their precedence, viz.: to lay on the table, on the question to commit, on the question to amend, and finally on the main question.

Principal and subsidiary motions cannot be made at the same time.

DUTIES OF OFFICERS.

President—The following are the principal duties of the president: To call the members to order at the time appointed; to announce the business in its regular order; to receive and put to vote all motions properly presented, and declare the result; to keep order; to receive and announce all communications; to sign all necessary documents; to rule on points of order; to appoint members of committees (when so directed); to represent the will of the assembly, and look after its interests.

Vice-President—If there be one or more vice-presidents it is the duty of one of them to preside in the absence of the president, and if there be none a temporary chairman is elected, in the choice of whom the secretary carries on the proceedings.

Secretary—The secretary's duties are to make a record of all things done in the assembly; to call the roll; to read all papers; to notify all committees appointed, and of the business referred to them; to sign such papers as may be necessary; to take charge and care of all the papers belonging to the assembly.

ORDERS OF THE DAY.

Orders of the day are the questions specially assigned for a particular day, and a motion calling for them has precedence of all others. A negative decision keeps the question which was pending when the call was made still before the house, while an affirmative decision removes it.

1. Are put in preference to all subsidiary and incidental motions.

2. The motion calling for them is not debatable, nor can it be amended, but it may be reconsidered.

3. This motion must be entertained, even though another has the floor.

ORDER OF BUSINESS.

All organizations have an established order of business, and sometimes make special orders in relation to particular subjects. When a motion is made to consider a proposition made up of several paragraphs it is read paragraph by paragraph; amendments, if any, offered on each paragraph when read. When all have been thus gone through the question is taken on the paper as a whole, whether amended or not.

On a paper being reported back from a committee to which it had been referred, the amendments only are read in their order until all are adopted or rejected before any other amendment is in order, except an amendment to an amendment. When the committee amendments have been acted on and amendments, if any, proposed by the house passed on, the final question is on the adoption of the paper as whole.

Introduction of Business—When a member wishes to make or second a motion, or make any statement to the meeting, he must address the chair, and by him be recognized by name; he is then said to have the floor, and may proceed. If two or more members rise to address the chair at the same time the chair recognizes him whose voice he first heard; and if his decision be questioned the sense of the house is taken.

A petition from outside parties is usually presented by some member, who states the substance of it and moves that it be received. Usually, if there be no objection, it is received without the formality of a motion. After being read by the clerk or secretary it is then the property of the meeting, to be disposed of as they see fit.

QUESTIONS OF ORDER.

Questions of order are those which relate to some breach of the rules. When a point of order is raised, it is decided by the chair without discussion, which decision may be appealed from and passed on by the house. The chair in stating the question on the appeal, says, "Shall the decision of the chair stand?" And in the debate, if any, which follows, the chair can participate.

If any member has the floor, he cannot be interrupted except by a call to order, and, after the point of order is decided, he may be allowed to continue. A member, when rising to interrupt another, must state whether it is on a point of order, a question of privilege, or for the orders of the

day, and it is usual for the chair to recognize such persons and ask them to "state the point," etc. In the meantime the person interrupted takes his seat and remains there till the question is settled, when he can resume.

It is considered in bad taste to be too punctilious in making points of order, and some members, in many organizations, often do so more from a desire to display their knowledge of parliamentary laws than to facilitate business, and the frequent "rising to a point of order" by the same member generally causes him to be viewed as a parliamentary "crank."

In most organizations, and even in our legislature assemblies, strict adherence to parliamentary forms is not followed in all its minor points; the essential aim and object of such forms being to arrive at conclusions and to register the will of the majority in as commonsense and equitable a manner as possible. And in this connection we would advise those who are ambitious to shine as parliamentarians and who fancy they are destined,

"The applause of listening senates to command,"

to keep their knowledge of the subtleties of the laws of debate from effervescing, and permit business to proceed if no material right is being infringed.

READING OF PAPERS.

1. When bearing on a question before the house any member has a right to call for a reading.
2. When relating to original matter, must be voted on.
3. Is not debatable and cannot be amended, but may be reconsidered.

PREVIOUS QUESTIONS.

1. Can be debated or amended.
2. Takes precedence of all subsidiary motions when made first, except to lay on the table.

The moving of the previous question, in this country, is generally for the suppression of discussion of the main question. It cannot be moved in committee of the whole. After being moved and seconded the chairman asks, "Shall the main question be now put?" And if decided affirmatively the main question is put immediately and without debate. If the decision be negative it operates differently in different assemblies. In our national congress it disposes of the main question for the day, while the legislatures of Massachusetts and New York leave the original question still open for discussion.

POSTPONEMENT.

1. Is debatable.
2. May be amended or reconsidered.

3. Can not be superseded by motions for the previous questions, to commit or amend.

4. Whether postponement be for a definite or indefinite time, the three preceding rules apply.

DEFINITE POSTPONEMENT.

A motion to postpone to a certain day, if decided affirmatively, removes the main question from before the house; but if the decision be negative, the suppression of the original motion may then be brought about by the previous question.

INDEFINITE POSTPONEMENT.

An affirmative decision on this motion entirely suppresses the original proposition, so that it can not be renewed; a negative decision leaves the question before the house.

PRIVILEGED QUESTIONS.

1. Can not be debated or amended, but may be reconsidered.
2. Take precedence over all others.

Privileged questions are those of greater importance to the assembly than the one under discussion. They have precedence of all other questions, and consist of motions to adjourn, questions relative to the rights of members, and those calling for orders of the day.

PRECEDENCE OF QUESTIONS.

1. To adjourn.
2. To lay on the table.
3. For previous questions.
4. To postpone to a certain time.
5. To commit.
6. To amend.
7. To postpone indefinitely.

Incidental questions embrace question or order, motion for leave to withdraw a motion, to suspend a rule, or to ask for the reading of papers, or an amendment of an amendment. They have precedence of the question which they arise.

TAKING THE QUESTION.

After all who seem desirous have spoken on a question, the chair asks the assembly if they are ready for the question, and if no one responds, or "Question" is cried by one or more members, the chair says, "All who are in favor of the motion answer 'aye.'" He then says, "As many as are opposed say 'no.'" And according as the ayes or noes predominate he says

the ayes have it, or the noes have it, or it is not a vote. If he has a doubt as to which side has a majority, or if having decided, a member doubts the result as announced, the chair may call on the members to rise and stand till they are counted on both sides; or he may divide the house, ranging affirmatives on one side and negatives on the other. Should a vote result in a tie, the chair has the casting vote, and while solving a doubt no other business is in order.

YEAS AND NAYS.

On taking what is called yeas and nays, it is stated by the chair thus: "As many as are in favor of, etc., will, when their names are called, answer 'aye,' and those opposed will answer 'no.'" The clerk or secretary calls the roll and marks the answers, and reports to the chair, who announces the result to the meeting.

Until the negative of a question is put, it is in order for a member to speak, or make any subsidiary motion; but when taking the yeas and nays, both being taken at the same time, neither debate nor a motion is in order.

RECONSIDERATION.

A vote already passed may be reconsidered, except a motion to adjourn; and if the moton to reconsider be carried, the original motion is before the house.

1. Can be debated together with the original motion, but can not be amended or reconsidered.

2. If carried in the affirmative, it opens the main question for discussion.

RECOMMIT.

Can be debated, amended or reconsidered.

SUSPENSION OF RULES.

1. Is not debatable, nor can it be amended or reconsidered. A suspension of a rule may be called for by a motion regularly made and seconded, and has precedence of the original motion. It is usually made for the purpose of allowing some business to proceed which some rule of the assembly prohibits.

QUORUM.

In all organized bodies it is necessary that certain number of members, called a quorum, should be present before any business can be transacted. This is considered essential to the end that the matter decided may fairly

represent the will of the organization. The number necessary for a quorum may be fixed as the assembly wills; and if, at any time during the meeting, the members present fall below the required number, the meeting must be adjourned by the chair.

SPEAKING.

Matter of Speaking—A member who has the floor is supposed to confine himself to the subject under discussion, and is not allowed to introduce irrelevant or extraneous matter, and it is the duty of the chair to call him to order, and request him to speak to the question. He is to use no personalities, nor any language reflecting on previous determinations of the assembled, except the pending motion be for annulling such prior legislature. The consequence of measure may be shown in detail and denounced, but the motives of its advocates can not be impugned.

Times of Speaking—As a general rule, a member is not allowed to speak more than once on a question till all others who are desirous of speaking have done so; but if incidental or subsidiary motions be introduced in connection with it, they are privileged to speak again. The mover and seconder may, if they so desire, speak to the question when the motion is made and seconded, but are thus shut off from being again recognized till all others have spoken. A member may, however, rise to give an explanation, or to clear a matter of fact, or set himself right, if his statements are being misrepresented.

MOTIONS TO SUBSTITUTE.

Can be debated, amended or reconsidered.

WITHDRAVAL OF A MOTION.

1. Is not debatable, but may be amended or reconsidered.
2. Must have a unanimous vote before it can be withdrawn.

TO HOLD MEETINGS OF FRUIT AND TRUCK GROWERS.

As a rule local fruit and truck growers' meetings are not very well attended; this is due to the fact that the meetings are usually dry and without any special interest to a great many. The president and officers should endeavor to arrange an interesting program. The members' wives and daughters should be encouraged to attend, as the subjects properly discussed are always interesting to all who attend, especially when some regular routine is inaugurated; for this purpose we offer a few suggestions which may prove of considerable value to increase attendance.

RULES OF MEETINGS.

1. Call to order by the president.
2. Opening by a few social remarks by the president.
3. Music, either instrumental or by suitable songs.
4. Recitations.
5. Debate on some live question.
6. Three-minute talks by members.
7. Business.
8. Good of the association.
9. Closing song.

A FEW LIVE QUESTIONS FOR DEBATES.

Selling for cash at loading station vs. consigning.
Market conditions and how to keep posted.
Seeds, what varieties succeed best.
How to construct and make vegetable crates.
The use of mail, telegraph and telephone for shippers.
Grading fruit and vegetables.
How to harvest, pack and ship different fruits and vegetables.
Pecan culture in the South.
Peach culture; how to succeed.
Native and wild grapes.
Profits from the strawberry patch.
Insects and spraying.
Irrigation and drainage.
What manures are especially adapted for different products.
Fertilizers on Irish potatoes.
Talks on establishing canning factories to use up the surplus.
Broom factory.
Beneficial laws to fruit and truck growing and shipping.
The problem of icing fruits and vegetables in transit.
Poultry and profits on a fruit farm.
Dairying and cream extractors.
Bee keeping as a source of profit and bees as useful distributors of pollen in the fruit garden.

PART VII.

CANNING FRUITS AND VEGETABLES, EVAPORATING FRUITS, PICKLE FACTORY, BROOM FACTORY AND BROOM CORN CULTURE, FACTORIES ON THE FARM, LEGUMINOUS AND FORAGE CROPS.

CANNING FRUITS AND VEGETABLES.

The establishment of canning factories throughout the South at points where fruits and vegetables are grown in sufficient quantities for shipping to markets has many advantages.

First—Because the over-ripe, maimed or bruised fruits or vegetables, in place of waste may be converted into a source of profit.

Second—In times of gluts in the markets of the perishable products, which must always occur with excessive freight or express rates, car shortage, the products may be saved with as much or even more profit than if they were shipped.

Third—The establishment of canning factories secures independence to the shippers or association; the factory employs labor, keeps the money for canned goods at home and adds wealth and prosperity to any town or community.

The demand at home and abroad for the canned goods is practically unlimited. Examine any grocery store in the South and the fact appears that over 90 per cent of all the canned fruits and vegetables were canned north of the Mason and Dixon line; leaving out all other consideration, the saving of freight charges alone presents an interesting item, besides the South is the home of the fruits and vegetables, for where only one crop of vegetables may be secured in the northern part of the United States and Canada, two, or even three crops may be harvested in the Southern States the very same season; indeed it would look reasonable if the South would supply the entire North with both fresh and canned fruits and vegetables, and as the South further develops this will not be a mere imaginary dream, but an established fact.

There is no reason why the cotton gin houses and machinery used in the fall and winter months for ginning cotton could not be used as canning factories to can the surplus during the spring and summer months, when otherwise the building and machinery would be idle and both would be kept in better condition by their use.

Profits of Canning.

The profits of canning fruits and vegetables depend somewhat on the size of the plant, home markets and freight rates for canning factories' accessories and supplies of tins, crates and also the price of labor.

A crate or box of two dozen three-pound cans of peaches, pears, apples, plums, figs, grapes, strawberries or blackberries usually sell from $2.00 to $3.00 per crate or box, holding two dozen cans; the cost of crate and twenty-

four tin cans and solder is about 50 cents; the profit on one thousand cans of fruit is about $35.00 after the fruit, labor, cans and crates are paid for: the profit on vegetables ranges from $20.00 to $30.00 per thousand. It must be borne in mind that the fruits and vegetables used in canning may in many seasons prove an entire loss in the absence of any canning factory.

How to Establish a Canning Factory.

Wherever there is already a Fruit and Truck Growers' Association, the establishment of a canning factory is less difficult; the matter is taken up at the meeting and an incorporated company established with from $2,000 to $5,000 capital, the members of the association subscribing stock for which the fruits and vegetables may be furnished. Generally a lot is bought conveniently located near the depot and accessible to wagons and a suitable building erected. The next step would be to engage the services of some experienced canning expert as manager until the factory may be run by local talent. We admit there have been some failures reported, but in most cases these failures were due to the fact that the factories were started on too big a scale, and, to elaborate, it is far more advisable to start the first year on a small scale until the wants of the canning factory and capacity is thoroughly understood. To run the factory part of the day and then wait until more produce arrives is conducive to failures, and that is just what happened to many factories that failed. Start small and increase the capacity as the occasion demands and no canning factory will or can fail.

Home Canning.

A home canning plant with the capacity of a few hundred cans per day may be established at a cost of $10.00; there are many excellent home canners on the market for the purpose.

Cost of Canning.

Canneries, as a commercial proposition, may be established at a cost, exclusive of buildings, from $250 to $2,000, as follows:

Plant No. 1—Capacity 2,000 Cans Per Day, Open Bath Process.

One 18-horsepower engine and fittings of piping to the tanks.
One scalding tank, diameter 36 inches, depth 24 inches.
One exhaust tank, diameter 36 inches, depth 24 inches.
One process tank, diameter 36 inches, depth 24 inches.
Four scalding baskets.

Two exhaust crates, one-tier.
Two process crates, two-tier.
One perforated steam coil or cross for scalding tank.
One perforated steam coil or cross for exhaust tank.
One perforated steam coil or cross for process tank.
One crane.
One 30-gallon gasoline tank.
One air gauge for gasoline tank.
Two gasoline fire pots.
One floor truck.
Four capping steels.
Four tipping coppers.
One forging stake.
One vise.
One thermometer.
One platform scale.
Two can tongs.
One syrup gauge.
One hammer.
Twenty-five buckets.
Six capping trays, 2x2 feet.
One packing table.
One capping table, 3x8 feet.

The above plant may be installed for $500.00. A building of two stories, 24x48 feet, would be a very suitable one for this size canning plant; the boiler may be placed at either end of the building, or better, in a boiler room adjoining; the first floor to be used for the process room and the second floor for storage of empties and supplies.

To operate this size plant would require fifteen hands; eight peelers, four packers, one processor, one capper and one foreman. Outside the foreman, processor and capper, the help may be unskilled labor, mainly women or children.

Plant No. 2.

Estimated cost of machinery for a plant of 5,000 cans capacity per day, complete, $650.

Plant No. 3.

Estimated cost of machinery complete for a plant of 10,000 cans capacity per day, $1,000.

Plant No. 4.

Estimated amount and cost of machinery for outfit of 20,000 cans capacity per day, complete, $2,000.

All of the above outfits are capable of canning all fruits and vegetables in the most satisfactory and up-to-date manner.

For particular information about prices, etc., of all canneries, and where machinery may be bought readers of this book are cordially invited to apply to our company, the Thomas-Wilson Publishing Company, 900 Main street, Houston, Texas.

There are also many accessories used in large canning factories, such as the pea hulling machine, rotary pea separator, corn cutting machine, corn silking machine, corn steaming and can filling machine, can dipping machine, exhausting machine, tomato and pumpkin filler, pumpkin peelers, pumpkin grater, tomato scalder, apple and peach parers, cocoanut and pineapple graters, cherry seeders, apple corers and quarterers, pea sieves, pea blanchers, peeling knives; all of the above are labor saving devices and reduce the cost of canning; the work may be run by steam power or by hand.

The Manufacturing of Cans.

All large canning factories manufacture their own cans, which is a decided saving on freight rates, as an empty can takes up as much room in a freight car as a full can. Machines for making cans, of sufficient capacity to satisfy ordinary canning plants can be bought complete for $500.

This machine will make two-pound or three-pound cans, which are mostly used.

A box of tin plate costs about $4,50 per box and will make 270 three-pound cans or 370 two-pound cans. The value of the cans ranges from $1.70 to $2.20 per hundred cans.

Standard sizes of cans are: One-pound can, diameter 2¾ inches, height 4 inches; two-pound can, diameter 3 7-16 inches, height 4 9-16 inches; three-pound can, diameter 4½ inches, height 4⅞ inches.

Labels.

There is nothing so conducive to the quick selling of canned goods as the bright and handsome labels on the cans; of late the art of lithographing has advanced so rapidly that the most handsome and highly colored labels may be secured at a nominal cost, and there is no better way to advertise canned goods. It is also well for canneries to establish a trade mark and have the labels copyrighted; all of these items secure success and profits to the canneries.

The best fruits and most commonly used for canning purposes are apples, apricots, blackberries, cherries, currants, grapes, peaches, pears, pineapples,, plums and strawberries.

The best vegetables and most commonly used for canning purposes are asparagus, string beans, lima beans, sweet corn, okra, okra and tomatoes, peas, pumpkins, squash, succotash, sweet potatoes and tomatoes.

HOW TO CAN FRUITS.

Apples.

Apples for canning should be pared and cored; this can be done by hand or steam power. After the apples are pared, cored and quartered, or halved, the apples are packed as solid as possible in the cans, which are then filled with water and can exhausted five minutes at 216 degrees.

Apricots.

Apricots should be carefully wiped (not pared), halved and seeds removed, packed as solid as possible, without bruising, in the cans, which are then filled with heavy cane or sugar syrup. Exhaust cans five minutes at 216 degrees.

Blackberries.

Blackberries should be spread out on the table and all leaves and trash removed (not washed); they are then placed in the cans and filled with either cold or hot water. Exhaust can seven minutes at 216 degrees.

Cherries.

Cherries may be either pitted or canned whole; the fruit should be thoroughly ripe and cleaned by hand picking, removing all green fruit, leaves, etc. The cherries are then placed in the can and the can filled with hot or cold syrup. Exhaust can seven minutes at 216 degrees.

Currants.

Currants should be spread out on the table and carefully picked over, removing all foreign matter, placed in the cans and the cans filled with hot or cold water. Exhaust can seven minutes at 216 degrees.

Grapes.

For canning, the stems of grapes are removed and the fruit carefully picked over, removing all tainted or inferior grapes, then placed in cans, filled with hot or cold water. Exhaust cans eight minutes at 216 degrees.

Peaches.

Peaches are the most popular of all fruits for canning purpose and are also the most profitable to can. The peaches after either pared or not, cut in proper sizes or whole, are placed in the can as solid as possible, without bruising, and the cans are filled with either water or syrup. Exhaust cans five minutes at 112 degrees.

Pears.

Pears, for canning, are either pared or not, cut in desirable pieces or canned whole. Place the pears snugly in the cans, fill with water or syrup. Exhaust cans six minutes at 216 degrees.

Pineapples.

Pineapples should be carefully grated, or sliced, removing all eyes and rind. Place the fruit in the can and fill with a heavy superior syrup. Exhaust can ten minutes at 216 degrees.

Plums.

Plums may be pitted or canned whole; the fruit should be spread out on the table and all green or wormy fruit removed, placed in the can and either water or syrup applied. Exhaust cans five minutes at 216 degrees.

Strawberries.

In preparing for the can, strawberries are spread out on the table and all leaves, trash and green berries removed (not washed); the berries are then placed in the cans, which are then filled with either water or a light syrup. Exhaust can three minutes at 216 degrees.

All fruits canned for the open bath allow twelve minutes at 216 degrees; closed bath allow five minutes at 250 degrees.

VEGETABLES.

The cans for asparagus usually open on the sides and after the stalks are carefully placed in the cans the vacuum is filled with slightly salty, either hot or cold water. Exhaust cans twelve minutes at 216 degrees.

Closed tops allow twenty minutes at 250 degrees.

Beans (String.)

Beans for canning should be very carefully picked over, removing all the tough and old beans, leaves and trash; place the beans then in the

strainer and dip into the scalding tank for four minutes, then fill the cans with the beans and add a weak brine. Exhaust cans twelve minutes at 216 degrees. Closed top, forty minutes at 250 degrees.

Beans (Lima.)

After the lima beans are pulled by hand, place the beans in the cans and fill with weak brine. Exhaust cans ten minutes at 216 degrees. Closed top, thirty minutes' process at 250 degrees.

Corn (Sweet.)

The corn must be young and tender, the grains removed from the cob, placed in cans and filled with weak brine. Exhaust cans fifteen minutes at 216 degrees. Closed top process at 250 degrees.

Okra.

Preparing okra for the cans, all the tough and stringy okra must be removed and also the stems; blanch the okra twelve minutes in hot brine, fill then in cans and add new strong brine. Exhaust can ten minutes at 216 degrees. Closed top process, twenty-five minutes at 250 degrees.

Okra and Tomatoes.

The okra is simply blanched like the foregoing description of canning okra, chopped up fine and added one-half in bulk to peeled tomatoes; add small quantity of water. Exhaust can ten minutes at 216 degrees. Open bath, allow thirty minutes at 216 degrees; closed top, fifteen minutes at 250 degrees.

Peas.

The Marrowfat variety is the best pea for canning. Peas, for canning, are first shelled and then run through a separator, hand picked, removing all yellow and black-eyed ones, blanched in the pea blancher until the skin contracts, then packed in cans leaving one inch clear in the cans for the swelling of the peas, fill the can then with a brine; a little sugar added to the brine will improve the flavor. Exhaust can fifteen minutes at 216 degrees. Closed top process, allow thirty minutes at 250 degrees.

Pumpkins.

If punipkins are first lowered in the scalding tank five minutes, the peeling may be removed more easily. After the peeling is removed, slice, grate or wash, fill the can tight, use no water or sugar. Exhaust cans twelve minutes at 216 degrees; open bath, thirty minutes at 216 degrees; closed top, fifteen minutes at 250 degrees.

Squash.

Squash are prepared for the can the same as pumpkin; no water or liquor being used. Exhaust cans fifteen minutes at 216 degrees; open bath, thirty minutes at 216 degrees; closed top, allow fifteen minutes at 250 degrees.

Succotash.

Succotash is simply a mixture of corn and beans; both ingredients should be young and tender and put in brine. Succotash is very popular and profitable to can. Exhaust cans ten minutes at 216 degrees; closed top, thirty minutes at 250 degrees.

Sweet Potatoes.

Cook the potatoes until nearly done, but yet firm; peel and cut the potatoes in halves and quarters. Exhaust cans ten minutes at 216 degrees; open bath twenty minutes at 216 degrees; closed top, ten minutes at 250 degrees.

Tomatoes.

Like peaches, in the fruit line, tomatoes are the most popular in the vegetable line; while the price is never high, the profits are sure and reasonable. To prepare tomatoes they are lowered in a wire basket into the scalding tank until the skin becomes entirely loose. The tomatoes are then peeled and passed to the packing table, packed very solid in the cans and capped. Exhaust cans fifteen minutes at 216 degrees. For three-pound cans, open bath, 25 minutes, at 216 degrees; closed top, allow 15 minutes at 250 degrees. For two-pound cans, five minutes less.

Cases should be made to hold two dozen cans and each case stenciled with the name of the contents and a handsome label for the cases is also advisable. If the fruits or vegetables are canned in a superior manner, the name of the canning factory or place of canning marked on the cans and cases stimulates the demand. Superiority of honest canning is soon recognized and rewarded.

Capping Solder.

No. 1 is composed of 100 parts lead and seventy parts tin.

No. 2 is composed of 100 parts lead and eighty parts tin.

No. 3 is composed of 100 parts lead and ninety parts tin.

No. 4 is composed of 100 parts lead and 100 parts tin.

For soldering fluid take muriatic acid and add zinc until quiet and no more bubbles appear and then add sal ammoniac about eight ounces for each gallon; with this fluid resin must be also added when soldering.

MARKET FOR CANNED GOODS.

Large cities like New York, Chicago, Baltimore, Philadelphia, Boston. St. Louis and San Francisco are the recognized center of the canning trade. but home market everywhere may be established, providing the goods are put up in a clean and attractive manner, for canned goods sell everywhere. on land or sea, and are as staple as flour. In small places the merchants are sometimes averse to taking hold of home made canned goods, as the jobbers from whom he buys are interested and are always anxious to push the factory goods. This opposition can be mastered by putting up goods equally as good or better and supply hotels, restaurants and families for a while; this creates the demand and forces the merchant to place the home articles on his shelves, as there will be calls for them.

FRUITS.

Varieties to Can.

Some fruits and vegetables do not can so well as others, therefore we give below a list of the most suitable varieties:

Apples—Baldwin, Red Astrachan, Nortern Spy, Winesap and Maiden Blush; the early kinds are not desirable.

Apricots—The Large Early, Golden and Moorpark.

Blackberries—Kittatinny and native wild.

Cherries—Belle de Choisy and Late Duke.

Currants—Fay's Prolific and Prince Albert.

Grapes—Concord, Catawba, Delaware and Rochester.

Peaches—Elberta, Alexander, Hale's Early, Crawford, Stump the World Oldmixon, Heath Cling and Early Rivers.

Pears—Le Conte, Kieffer, Bartlett's & Clapp's Favorite.

Plums—Golden Drop, Green Gage, Imperial and Wild Goose; many of the new Japanese varieties may also be canned, particularly the Satsuma and Burbank.

Strawberries—The Newman, Klondike and Sharpless.

VEGETABLES.

Varieties to Can.

Asparagus—Oyster Bay.

Beans—Golden Wax, Black Wax, Kidney Wax and Valentines.

Beans (Lima)—Large White Lima and Seba.

Corn—Evergreen and Adams Early.
Okra—The Lady Finger and Prolific.
Peas—Marrowfat and Champion of England.
Pumpkin—Any sweet and hard variety.
Squash—Barton, Marrow or Hubbard.
Sweet Potatoes—Jersey Yam, Jersey Sweet, and Pumpkin Yam.
Tomatoes—Stone, Acme, Trophy, Queen, Dwarf Champion or Livingstone Favorite.

MISCELLANEOUS CANNING RECEIPTS.

To Preserve Figs.

To preserve figs is not difficult, although many fig preserving plants in the South are claiming to have a great secret in preserving figs. Here is the whole secret: Place the figs in a wire basket and dip the whole basket in lukewarm lye water; this starts the skin, which removes easily. Place then the fruit in layers in glass jar or tins and fill up the vacuum with nice clean syrup and seal or solder up tight. This process will produce as good preserved figs as anyone can purchase. The Magnolia fig or Celeste or Sugar fig are the most popular kinds for preserving.

CANNING WITHOUT COOKING.

Select tomatoes, perfectly fresh and firm and not too ripe, of a size to go into the cans without cutting. After removing the skins, fill the jars, add salt to each jar (about one teaspoonful), fill with boiling water and seal at once with covers that have been boiled in a vessel on the stove. See that all spaces are filled with water, allowing no large air bubbles to remain. Screw covers down tightly and place jars in a wash boiler or canner containing boiling water, and allow to remain until the water is cold. Tighten the cover again if necessary, and put in a dark, cool place.

The jars should all be fitted with covers and tested, to be sure they are air-tight, before the fruit is put in, not to get the covers mixed after fitting.

Fruit is canned in the same way, using boiling syrup instead of salt and water. In this way we successfully canned 200 quarts of fruit, consisting of raspberries, currants, cherries, pared plums, grapes, soft peaches and soft pears. Strawberries, hard peaches, hard pears and apples will not keep prepared in this way.

We have never had a single jar of fruit spoil, and the work of canning is reduced to a minimum. The fruit retains its shape perfectly and tastes almost fresh.

Green Tomato Sweet Pickle—Eight pounds green tomatoes chopped fine; add four pounds brown sugar and one quart vinegar. Boil half an hour until quite tender. Add one teaspoonful flavoring just before it is done.

Green Tomato Pickle—One peck tomatoes and one-half dozen onions. Slice and pack in layers with a cup of salt between.

Tomato Vinegar—One-fourth to one-half pound of sugar to the gallon of tomato juice will make a good vinegar.

To Make Spiced Vinegar—For each gallon of good vinegar, slice small garlics, 6; small onions, 1 dozen; horseradish, 2 good sized roots, sliced; bruised ginger root, 4 oz.; black pepper and allspice, unground, each 2 oz.; cloves, 20; cayenne pepper, 1 dozen, or 3 or 4 medium sized red peppers; and mustard seed, 4 ozs. Put all into stone jar on back of stove, and steep, or keep hot 6 to 10 hours; then strain and bottle for use, or leave in jar.

Corn Vinegar—Cut off cob one pint of corn, take one pint of brown sugar or molasses, and 1 gallon of rain water. Mix all, cover with a cloth, set in the sun, and in three weeks you will have a good vinegar.

SOME IMPORTANT THINGS TO BE REMEMBERED IN CANNING.

Don't leave your soldering irons in fire when not using them. You will burn the tin off.

Keep coppers and steels nicely tinned if you wish to solder easily and nicely.

Use wooden or earthenware vessels for holding prepared fruit, as tin will darken it.

Paste for Labels.—Take one-half cup of flour, stir in cold water to wet; one-half teaspoon common glue and pour it all into a pint of water and stir till it boils. Thin it to suit with hot water.

To Label Cans.—Take small brush and put paste one-half inch wide from top to bottom of can. Paste on one end of label. Now wrap label around can and paste where ends of label lap.

Number of 3-pound cans to bushel (2-pound cans run about 50 per cent more): Standard peaches, 18; pie peaches, 23; pears, 30; apples, 20; berries, 32; string beans, 20; sweet potatoes, 20; tomatoes, 18.

Baltimore packers pay the following prices for fruits by the bushel: Standard peaches, 50c to 75c; pie peaches, 25c to 40c; pears, 50 to 75c; ap-

ples, 25c to 50c; sweet potatoes, 40c to 50c; blackberries, 40c to 65c per crate; strawberries, 80c to $1 per crate; plums, 75c to $1 per bushel; tomatoes, 18c to 30c.

EVAPORATING OR DRYING OF FRUITS AND VEGETABLES.

The constant increase of production of fruits and vegetables in the South will necessitate many provisions to use the surplus of the best, as well as the inferior fruits. While canning forms a valuable auxiliary for that purpose, the products should also be preserved by the art of drying or by evaporation of the water; this process of preserving is more simple and less expensive than canning, no cans or expensive machinery being required, heat forming the basis from the wet to the dry transformation. The art of drying either by sun or artificial heat is much older than canning for the preservation of meats, fish, fruits and vegetables, and is even now more extensively practiced in most countries because it is the least expensive and serves the purpose as well and even better on many products.

It requires about five pounds of ripe fruits or vegetables to produce one pound of dried. Some fruits and vegetables contain less water than others and for that reason those that contain the least water are the most profitable for drying. Among the fruits, the most valuable for evaporating or drying are the apple, pear, peach, apricot, fig, grape, strawberry, dewberry and blackberry.

Among the vegetables, the egg plant, mushroom, English pea, pepper, both the Irish and sweet potato; there are a few others but of less value.

TYPES AND MODES OF EVAPORATION.

The most primitive way and by no means an inferior way is the sun drying, which is highly suitable on the home farm, where labor and time are not of any great consideration. The process is rather tedious, as the products have to be closely watched, turned, and secured under shelter during rain and even at night from the dew. Raisins from grapes are almost invariably sun dried, but the grapes are transported to mountain plateaus, where there is neither rain or dews; where there are no mountains and where the evaporation of fruit and vegetables becomes a commercial proposition, artificial heat, in furnace and ovens are used for the purpose.

TYPES OF EVAPORATING APPARATUS.

The most simple are the cook stove evaporators, small box-like structures, made either from sheet or galvanized iron and placed on the stove; these portable ovens, as we may term them, are provided with numerous trays upon which the products are spread out; the amount of fruits and vegetables is limited and mostly only for family use; some times the amount dried in these ovens does not exceed two bushels a day, but sufficient to supply the family wants.

The next grade of evaporators are the portable outdoor concerns; these are very convenient, but still limited to about ten bushels per day; these evaporators are mostly constructed out of wood except the parts exposed to the fire. The highest and most efficient grade of evaporator for commercial use are the kiln evaporators; The amount of products that may be dried for market in these kilns is only limited by the capacity and amount of space and heat provided.

In some commercial kilns several thousand bushels of fruits and other products are dried every twenty-four hours; these kiln dryers are furnished by special manufacturers, who also provide the means of heating and all other accessories to conduct the business, and upon application to our office, the address of manufacturers and prices of the different capacities will be given to our readers.

PREPARING FRUITS FOR DRYING.

Apples, pears and peaches are usually pared by hand or a paring machine, for the higher grades of dried fruits, all defective, unripe, wormy fruit being culled out; the cheaper grades are dried or evaporated without paring. Grapes, figs and berries of all kinds are simply cleaned by hand and assorted over to remove all decayed portions of the figs, grapes or berries, as no sound dried fruit or vegetables can be expected from inferior or partly decayed fruits. After the fruits have gone through this process of paring or assorting, they are ready for the dryer; the fruit is placed in the trays from two inches to four inches in depth; the trays are then placed in the oven and the heat applied; the temperature in the oven or dry kiln is then raised from 125 degrees to 150 degrees and positively not higher, as there would be danger of scorching or burning the contents of the ovens; after one hour the products, whatever they may be, should be turned over; after this turning the fruit should remain in the dryer until thoroughly dried; the time required to dry the fruit depends on the steadiness of the heat and

also upon the thickness; the fruit on the trays, usually from six to twelve hours accomplishes the object.

The bottoms of the trays should not be tight; very frequently wire netting is used to facilitate the hot air to penetrate the mass. It often occurs, when wooden trays are used that the fruit sticks to the wood; this may be avoided by oiling the bottoms and sides of the trays on the floor of the kiln dryer slightly with a mixture of tallow and linseed oil. No bad effects will be noticed if the mixture is not applied too heavy, which is unnecessary.

To become perfect in the art of evaporating either fruits or vegetables, some experience will always be the best teacher, but by following the above directions, anyone may avoid failures altogether, and achieve partial success until practice of a few trials assists.

The main point is to have the product nice and clean and keep a close watch on the amount of heat; 150 degrees is the danger line.

Bleaching.

The bleaching process is employed only in apples and pears to prevent the fruit from turning dark after it has been sliced, on the cut edges. As soon as the fruit is cut it is placed in an air tight receptacle and subjected to the fumes of sulphur about forty minutes. It requires about ten pounds of sulphur to bleach one ton of fruit; if bleaching is carried to excess it becomes injurious to the health of the consumer and is prohibited by the pure food law. Special receptacles for bleaching are made out of sheet iron and are furnished by manufacturers. In large evaporating plants, trays of fruit pass right through the bleachers on rollers or tracks to facilitate bleaching.

Slicing.

In preparing fruit for the dryers it is sliced after being pared, and followed immediately by bleaching. Slices should not be over one inch in thickness.

Kind of Packages Used for Dried Fruits.

In packing dried fruits, several sizes of packages are used. The package most in use is the 50-pound wooden box; the dimensions of this box is 10½x11x22; also boxes containing 25 pounds are also standard. Pasteboard boxes containing one pound and two pounds, decorated with handsome labels are much used and are very popular with the trade; as in many other enterprises the main points in either drying or evaporating fruit and vegetables is cleanliness, wholesomeness and attractiveness of the goods.

Growing Cucumbers and Establishing Pickle Factories.

The growing of cucumbers in the South for the Northern market has of late years become very profitable and the industry of growing them can

be made even more profitable, where a pickle factory is established for the manufacture of plain pickles, spiced pickles, mixed pickles and chowchow.

In large pickle factories, the small cucumbers from one inch to four inches are brought to the factory in bushel baskets or boxes; they are then washed in clean, cold water, dried and assorted in about three sizes; they are then placed in strong brine, strong enough to float an egg, to which is also added one ounce of alum to every ten gallons of brine; this preserves the color and causes them to contract and become hard. The pickles may be left in the brine until wanted for the receptacles in which they are to be deposited for the market; often these salt pickles are salted at the place of production and afterwards transported in tanks or barrels to the factory.

After the pickles are cured in the brine they are placed in glass jars, bottles, kegs or barrels and vinegar poured over them to completely fill the vacuum; for fancy trade the vinegar is spiced with pepper or other preferable spices. Many manufacturers of pickles, in order to improve the appearance of the green color, use acids, copper green, which is injurious to health and contrary to the pure food law. Our directions will produce only wholesome and unobjectionable goods.

Chowchow.

Chowchow is manufactured from green beans, parts of green tomatoes, cucumbers, cauliflower and onions. These ingredients are all cured in brine, as previously described, chopped up in small, suitable pieces, put in the receptacles, either glass bottles, jars, kegs or barrels and the vacuum filled with a mixture of mustard and vinegar. This class of goods is highly profitable because odds and ends of the products may be used, unfit for the specific pickling.

Dill Pickles.

Select any size cucumber, but not too ripe; wash and dry them carefully with a towel. Open the end of a barrel and lay the cucumbers in layers; for every six inches in depth of the cucumbers place a layer of grape leaves and dill; continue this until the barrel is full; replace the head tight and lay the barrel on the side, open the bunghole and fill in with strong brine until quite full; leave the bunghole open; the pickles will now undergo the process of working; have some extra brine on hand and keep the barrel full until the working stops, which may require several weeks, depending on the temperature. When there is no more appearance of foam the pickles are done and ready for use. The barrel can then be closed up and stored for future use or market.

Home Made Pickles for Family Use.

Cucumber Pickles—Pick cucumber, being careful to leave on stems. Small cucumbers make the nicest pickles. Wash them, sprinkle on enough salt to nearly cover, then pour boiling water over them. Let stand till cold, or over night. Drain off the salt and water, and put them in cold, spiced vinegar. Repeat this whenever cucumbers are picked, or until you have pickles enough. These are for present use; if it is desired to keep over winter, take them out of first vinegar, and cover with more, spiced to suit the taste, taking care that the vinegar is scalding hot; put in a piece of alum size of a hickory nut for every three gallons of pickle. The alum helps retain the green color of cucumber, but may be left out if desired.

BROOM CORN CULTURE.

The growing of broom corn and the establishment of broom factories is an extremely profitable venture, in the South especially, where most of the brooms are imported from other States. Broom corn is more profitable than cotton or any other farm product per acre and requires no more cultivation than corn and less labor than cotton.

The yield of broom corn will average from ten to twelve hundred pounds of dry brush per acre and is rated at $85 per ton, and is as staple an article as cotton or any other crop that a farmer could raise. Two crops can be raised from the same land in one year and it will stand a drouth better than any other crop. Two plowings, ordinarily, is sufficient to make a broom corn crop. It is estimated that Oklahoma produced upwards of forty thousand tons last year, and they have for several years past been raising broom corn, and every year they increase the acreage.

Kansas, Missouri, Illinois, Indiana and Oklahoma produced the greatest amount of the broom corn raised in the United States.

Planting.

Planting may be done early in April, but in the extreme North it should be deferred until the first of May, or later. In no case should planting begin until the soil has become thoroughly warm. Since broom corn is more susceptible to cold weather than Indian corn, and equally as susceptible as sorghum or millet, if planted too early the seeds are not only liable to rot in the soil or germinate poorly, but the plants that do appear will be weak and the stand and growth irregular.

With those having no experience with broom corn growing it is preferable that they delay planting until it is safe to plant cotton and cow peas. When the young plants first come up they are slender and delicate, growing very slowly the first two or three weeks. This early slowness of growth is more marked with early planting and cool weather than with later planting in warm weather. One of the most necessary and profitable operations in growing of any crop consists of thorough preparation of the soil before the crop is planted, and this is particularly true of broom corn. Two or three cultivations at intervals of ten or fifteen days before planting will go a great way towards the destruction of the growth of young weeds that successively spring up as the weather becomes sufficiently warm for their germination. Each shower at this season of the year will start a new crop of weeds, and as soon after rain falls and the ground is dry enough for cultivation, the weeder, harrow, cultivator, disc or some such surface working and weed destroying implement should go over the field with such care and thoroughness as if the crop was already growing. This preparative cultivation does not only destroy the first few crop of weeds, but gives to the soil a physical character that will manifest itself in the quick germination of the seed into strong and rapidly growing young plants, facilitating their future cultivation and growth.

Broom corn rows are usually about three and one-half feet apart, though the dwarf forms may be given four to six inches less space. The distance the plants should stand in the row depends upon the fertility of the land, and as to whether the dwarf or standard varieties are grown. They should be thicker on fertile land, about four plants to the foot for the standard, and about six for the dwarf should be the distance for plants to occupy in the row for soil of medium fertility. On more fertile soil the stand may be thicker, and thinner on less fertile soil. A regular uniform stand is necessary to secure a uniform quality of brush. Just such quantity of seeds should be sown as will give the desired stand with as little thinning as possible. It is necessary to have the best seed and the pest preparation for the attainment of this. Some broom corn growers sow a superfluous quantity of seed and thin to a stand. But thinning broom corn is a tedious and expensive task, and one that is frequently neglected, as is the case with sorghum. Corn planters with plate holes small enough for broom corn seed may be employed for planting. The seed should be covered from one-half to one inch deep, the depth depending on the character of the soil and the quantity of moisture in the soil at the time of planting. If the soil is dry when the seeds are sown, they should be covered deeper than would be necessary if the soil was in good moist condition. Plantings made say May, June or July, should be made deeper than those made early in May

or April. Should a heavy rain occur before the seeds have germinated, the field should be gone over broadcast with a harrow as soon as the soil will admit. This prevents the formation of a crust on land of that nature and hastens the germination of the seed. Cultivate same as you would Indian corn.

When broom corn is in the milk or dough state it should be cut and left in the field one day and hauled out and spread until thoroughly dry. Care should be taken to table it or bend it when the bush makes its first appearance, or else the brush will as the seed matures fall down and become crooked.

Broom Factory.

We have often been asked through the columns of our paper, the Southern Shippers' Guide, by our readers and subscribers for information about the cost and profits of broom factories and we take this means to reply to all; in fact all the information in this book, the Modern Guide, is based on inquiries for knowledge in the orchard, garden or on the farm, for profit. There is a general supposition that the establishment of broom factories is costly and the manufacture of brooms difficult, requiring skilled labor and a vast amount of experience. About the cost we will say, "Big oaks from little acorns grow." Some of the largest broom factories in the East and West, representing thousands of dollars, started with hand machinery, costing less than $100 for the entire outfit; many are even now operated by hand machinery and they have added to their output only by operating more machines as fast as the demand for the brooms required it. In fact, the cost of the machinery to establish a broom factory is so slight that the business can never be monopolized.

We have before us circulars from a broom factory supply house, enumerating the total cost of the entire machinery at $70. The profits of the first month will pay for the outfit under reasonable circumstances. These manufacturers also supply minute information on how to operate and make brooms, so anyone may proceed to make brooms with, at least, partial success, until practice and experience insure complete success and profits.

Proper Locality for Starting a Broom Factory.

The proper place to start a broom factory is where there is none in operation, and where the brooms are imported from other localities for local use, for wherever there are houses with roofs and floors, there is a demand for brooms, the same as for the necessities of life. The broom factory once started, and a serviceable broom made, the demand is liable to grow more rapidly than the factory can supply the brooms. It all de-

pends on the quality of the goods and the prices to meet all competition abroad; the matter of freight charges are in favor of the local brooms made at home. The factory may also be operated during the winter months or inclement weather as a side line to orcharding, trucking or farming.

PICKLE RECIPES.

Sweet Tomato Pickle—Slice one peck of green tomatoes and two good sized onions, sprinkle over them a teacup of salt and let stand twenty-four hours. Drain and add two tablespoonfuls each of ground allspice and ginger. Put into a preserving kettle, with two pounds of sugar, and vinegar enough to cover; simmer until they look transparent. Bottle and seal tight.

Ripe Tomato Pickle—Pare ripe, sound tomatoes (do not scald), put in a jar; scald spices (tied in a bag) in vinegar, and pour, while hot, over them. This recipe is best for persons who prefer raw tomatoes.

Artichoke Pickle—Cleanse and lay in salt water for a day, drain and pour over them cold spiced vinegar, adding a teaspoonful of horseradish to each jar.

Beet Pickle—After removing all dirt from the beets, let them simmer in boiling water for about one and one-half hours, or until they may be easily pierced with a silver fork, then take them out and leave to cool. Boil vinegar, using two ounces of whole pepper, two ounces of allspice to every gallon, for ten or fifteen minutes and leave to cool. When cold pour it over the beets (which you have previously pared and cut into thin slices). Make air-tight and they will be ready for eating in a week or ten days.

Pickled Onions—Peel the onions, which should be fine white ones, but not large. Let them stand in strong brine for four days, changing it twice. Heat more brine to a boil; throw in the onions and boil three minutes. Throw them at once into cold water and leave them there four hours. Pack in jars, interspersing with mace, white pepper corns and cloves. Fill up with scalding vinegar, in which you have put a cupful of sugar for every gallon. Seal white hot. They will be ready for use in a month, but will be better at the end of three months.

Sweet Pickled Peaches—No. 1—One-half peck peaches, two pounds brown sugar, one pint vinegar, one ounce stick cinnamon, cloves. Boil sugar, vinegar and cinnamon twenty minutes. Dip peaches quickly in hot water, then rub off the furr with a towel. Stick each peach with four cloves. Put into syrup, and cook until soft, using one-half the peaches at a time.

Sweet Pickled Peaches—No. 2—Peel the fruit and leave the seed in; to five pounds of fruit add three pounds of sugar, one quart of vinegar, with spices to suit the taste; boil until a straw can be easily stuck through them, as a test for being cooked enough.

To Make German Pickles—Cut up equal quantities of cabbage and tomatoes; one-third as many onions and green pepper. Salt to taste, boil in vinegar till done, put in sugar and flavor to taste.

Excellent Mixed Pickle—Twelve large cucumbers, sliced; chop one head of cabbage, and two green peppers; slice one quart small onions; one-fourth ounce turmeric, one ounce mustard seed, one ounce celery seed; three pounds brown sugar, three quarts good vinegar. Boil thirty minutes.

Green Tomato Pickle—One peck of green tomatoes, two quarts of onions, vinegar, one-half tablespoonful of cayenne, one-fourth tablespoonful of ground mustard, one teaspoonful of turmeric, two pounds of brown sugar, one-half pound of white mustard seed, one half ounce of ground mace, one tablespoonful of celery seed, one tablespoonful of ground cloves, one-half bottle of salad oil.

Sweet Spanish Pickles—Two heads of cabbage of medium size; three dozen green tomatoes; two dozen cucumbers and eight small green apples. Cut the cabbage in small pieces, also the cucumbers and tomatoes. Sprinkle with salt and let stand over night. In the morning drain in the colander and scald each separately in weak vinegar; throw this away. Put all in a crock and cover with the following mixture: Four and one-half pints of vinegar, four pounds brown sugar, one teaspoonful each of white mustard and celery seed; one spoonful of turmeric and ground cinnamon mixed in cold vinegar. Cook all together, pour over vegetables while hot; add a handful of raisins.

Tomatoes and Onions—Slice the tomatoes and onions very thin; sprinkle a little salt through them; stand over night. Drain them through a colander and put them on to boil with enough vinegar to cover them and boil slowly until they are clear and tender, then drain them from the vinegar. Put into some fresh vinegar the sugar, mustard seed, mace, celery seed and cloves and let them boil for a few minutes, then pour it over the drained tomatoes, which have been mixed with the cayenne pepper, ground mustard and turmeric. Mix them well together, add a half bottle of salad oil and when cold put it in jars.

LEGUMINOUS CROPS.

Leguminous crops differ from other crops in the fact that in place of impoverishing the soil by their growth upon the land they enrich the same, and

other crops following leguminous crops are benefited thereby. For instance, a crop of cow peas may be grown upon a piece of land; both the vines and peas removed and yet the land would be greatly enriched, where other crops would have exhausted the land. This phenomenon is explained that leguminous crops, such as cow peas, clover, tare, vetch,, supine and soy beans are atmospheric feeders, storing carbon and nitrogen in excess of their own needs in their root systems and these valuable ingredients remain in the ground after the top crop is removed and are absorbed by future crops or the land. The leguminous crops are valuable on the farm, because in addition to benefiting the soil they are valuable forage crops and nothing can be lost in growing them. These crops are especially valuable to the orchardist and truck growers because they may be sown broadcast in the orchard and plowed under at a nominal cost and the orchard greatly benefited by the process; for the gardener or truck grower they are even more valuable yet, because the truck crops only occup the land short periods of the year and in place of the land producing obnoxious weeds or grains when the truck crop is removed, the sowing of the leguminous crops keep the land clean of weeds, the roots loosen the soil and at the same time enrich the same. An additional beneficial feature of these crops is: When plowed under while in the green state provide humus to the soil, in addition to the fertilizing qualities.

FORAGE CROPS.

Forage crops are one of the most valuable adjuncts to Southern farmers, fruit and truck growers. After the land has become vacant in the early summer, it is an injury to allow it to become hard and full of weeds, when forage crops, such as cow peas, peanuts, Kaffir corn, may be planted, which all improve the ground and provide nutritious food for man, stock and poultry.

Something to sell every month of the year is a good maxim to follow; something to eat every month on the farm is just as good, because it saves buying and helps to put money in the banks.

Peanuts.

All Southern farmers are beginning to recognize that the peanut crop is valuable as an auxiliary crop.

It is unsurpassed for hog fattening on account of the rich oils and fattening properties; ground up rough, it is an excellent food for chickens and cows, as it is followed with liberal laying of eggs and rich milk.

Spanish Peanuts.

Spanish peanuts are the most prolific, earliest and most quickly grown. A crop may be made in less than three months; therefore in Texas, Spanish peanuts may be planted as late as July 30 and make a good crop.

Planting.

Prepare your ground well by deep plowing and give it a thorough harrowing; lay off your rows three feet apart and drop two peanuts every ten inches; it is advisable to shell the nuts. Cover the seed about two inches deep, cultivate with shovel plow and give them one or two good hoeings. When they are matured, pull them up and expose the roots and nuts to the sun for a few days. After they are dry, they may be stacked or hauled in the barn; the vines make excellent hay. For the nuts there is always a good demand, ranging from $1.00 to $1.50 per bushel.

While we highly recommend the Spanish peanuts to our readers, we cannot recommend the Virginia White or Tennessee Red, as they have not proven a success in the South so far; while they grow perfectly, they do not attain the color and flavor which they do in their native State, and which is exacted by the trade.

Kaffir Corn.

In regard to Kaffir corn the Farm and Irrigation Age says:

The acreage of Kaffir corn west of the Mississippi is increasing each year. In a great many cases it is grown entirely for the fodder, and in the semi-arid regions, where ordinary Indian corn will not mature on account of deficient moisture, the growing of Kaffir corn is very important from the feeder's standpoint. Experiment stations in the West have made extensive tests comparing Kaffir corn with ordinary Indian corn, and the Kansas station concludes that under no circumstances has it been found that Kaffir corn will not serve satisfactorily as a substitute for Indian corn.

The experiments show that bushel for bushel Kaffir corn does not have the feeding value of ordinary corn, there being a difference of about 20 per cent in favor of Indian corn when each is fed alone to hogs. However, neither corn nor Kaffir corn is proper feed alone, and with some balancing feed like alfalfa, linseed meal, or soy bean meal fed in addition, the difference disappears almost entirely.

This fact, together with the much greater yield of Kaffir corn, leaves the Kaffir decidedly in the lead. It has practically the same digestive analysis as corn. To each 100 pounds there is 7.8 pounds of digestive protein, 57.1 pounds of carbonhydrates and 2 7-8 pounds of fat. Protein is somewhat deficient in Kaffir corn and also in Indian corn; therefore they must be

fed with some other food rich in protein to make up the deficiency. During the past ten years it appears that the average yield of an acre of Indian corn fed to hogs will produce 400 pounds of pork, while an acre of Kaffir corn will produce 487 pounds.

In some further tests, hogs fed a mixture of Kaffir and Indian corn, half and half, made better gains than where either corn or Kaffir was fed alone. Hogs fed Kaffir corn made a gain of 44 pounds in 50 days. When given dry alfalfa hay in addition they gain 65½ pounds in 50 days. When fed four-fifths Kaffir corn and one-fifth soy beans they made a gain of 86½ pounds in 50 days. This gain was made with lots of ten each averaging 140 pounds at the beginning of the experiment. It should be noted that the alfalfa hay used in this experiment was of a poor quality. In this test 333 pounds of pork were credited to each ton of alfalfa hay. In another experiment, which was a duplicate of the one just mentioned, the hay was of excellent quality, and there was a gain of 86.8 pounds of pork due to the influence of one ton of alfalfa hay.

The quality of the pork from Kaffir corn fed hogs was a high grade. Fifty head were sent to St. Joseph, Mo., and the slaughter test showed that the animals dressed from 70 to 80.4 per cent edible pork. The packing house which had the animals in charge stated that they showed good distribution of lean and fat.

It will be seen from above, that Kaffir corn should not be overlooked; it is about as easily grown as weeds and surely more profitable.

Variety.

The red Kaffir corn is very good, growing to the height of about from five to eight feet; the stalks are slender and juicy and leafy; it grows well even on poor land and is a little earlier than the white; our favorite has always been the white Kaffir corn; the seeds are larger and less brittle, the stalk shorter and more leafy, the seed-heads form at the top of each stalk, and as soon as these mature, other seed-stalks appear on lower joints.

Planting.

Prepare your ground well by plowing, and lay it off three feet apart, sow your seed in the rows to average a seed every four inches; it takes about five pounds of seed to sow an acre in rows; the corn may be broadcasted if desired for forage alone, and mowed with the machine and tied in bundles; it will take about twenty pounds to the acre to broadcast. The sowing in rows is more economical, as it will yield a much larger percentage of corn.

COW PEAS FOR PROFIT.

Cow peas, as far as their habits and cultivation is concerned, are really a bean rather than a pea.

Cow peas are a most valuable crop for the Southern farmer. What the clover is to the Northern farmer the cow pea is to the Southern, as a source of forage and enriching the soil, and no Southern farm, either large or small, should be without a liberal patch of cow peas during the summer and fall months. It is usually supposed that cow peas, in order to enrich the soil must be turned under while still green; this is, however, erroneous; it is true that the cow peas turned under while green supply a humus to the soil which undoubtedly is beneficial, yet is not necessary as the roots of the peas contain a large percentage of nitrogen, which is of the most value for further crops and any piece of land where cow peas have been grown is richer in nitrogen, which is of the most value for further crops, even if the vines and fruit have been removed.

The planting of cow peas should be encouraged, especially by fruit and truck growers, for both orchard and truck lands, as the peas will keep the ground shaded, loose and sweet for future crops and destroy noxious weeds. Both the vines and peas are excellent food for stock and poultry, and find a ready market always at hand for the threshed peas.

Soil.

The cow pea will grow on any land not too wet, and even make a fair crop on worn land; they will make the best growth on medium rich land.

Planting.

The planting of cow peas can be done in drills or broadcast; if planted in drills they can be cultivated, which is very beneficial and the peas are more easily gathered. Most farmers broadcast the peas by plowing or harrowing them in, which is a very satisfactory method. From one and one-half to three bushels of seed should be sown to the acre.

Varieties.

There are many good varieties of cow peas; the most favorite kinds are the Whipporwill pea, which is a bunch variety, very productive and hardy. The Clay pea is also one of the best kind for Southern growers; it is of large foliage, long roots and abundant bearer. The Lady pea is a great favorite, as it is a delicate small pea, very acceptable for table use, and much in demand at fair prices. The large black-eyed peas are probably the best money makers, for picking dry for market.

PARA GRASS (Panicum Molle).

This grass is a native of South America and has been grown somewhat commonly in Florida, to a very slight extent in Southern Texas, and occasionally throughout the Gulf Coast region. It is a perennial which makes its best growth on damp soils, though it has been fairly successful in Texas ranches where irrigation is needed for most other crops. It is not injured by prolonged overflows, making a vigorous growth where the land is under water several weeks. It is especially valuable for planting on ditch banks, on the margins of ponds and on soils two wet and "seepy" for the cultivation of other crops. It is used for both hay and pasture. Para grass will not withstand a lower temperature than 24 degrees Fahrenheit. It is therefore adapted only to the extreme southern portion of the country and California. It has succeeded as far north as Charleston, S. C.

Planting.

Para grass is usually propagated by planting pieces of the running stems, which often makes a growth of twenty to forty feet in a season. Pieces of the stems from twelve to fifteen inches long and having three or four joints grow rapidly when simply pushed down into freshly plowed ground, so propagation is neither difficult nor expensive. If cuttings are planted ten feet apart each way, they will cover the ground in the course of a season. This is the best way to secure a large number of cuttings for planting the next season. When the supply is sufficient it is much better to plant only about two inches apart in each direction, as when thickly planted the stems are not nearly so coarse. The first growth from the cuttings is in long, prostrate runners, but as soon as the ground becomes fairly well covered it becomes more erect, soon reaching a height of three to four feet, so the closer the cuttings are planted the sooner a crop will be secured.

Uses.

If wanted for hay, Para grass should be cut when it reaches three to four feet in height. From three to five cuttings may be made in a season, and, as from one to three tons of hay are secured each cutting, the total yield is quite heavy. Both Texas and Florida growers report having made as much as twelve tons of hay per acre in a season. The hay is rather coarse, but is excellent quality. When used for pasture the grass stands tramping well and is relished by all kinds of stock.

The yield is greatly increased by annual plowings. Some growers prefer to plow in November or December, as plowing at that time is sure to cover portions of the stems, so that they will be well protected in case of a freeze,

while other cultivators, living below the frost line, prefer to plow in July, sacrificing one midsummer cutting of hay, but loosening the soil, so as to secure heavy August and October cuttings and abundant winter grazing. An annual plowing is certainly beneficial, but the season when it can be done to best of advantage seems wholly a matter of the probable winter temperature. While this grass makes very long runners which root at every joint, the runners are wholly above the surface of the ground and so can be destroyed without great trouble. This grass should be extensively tried under irrigation in Arizona and California. It is one of the very few grasses that will yield as heavily in gross tonnage as alfalfa. There is reason to believe also that in a dry climate satisfactory seed can be grown.

FEEDING VALUE OF SOY BEANS.

The soy bean and soja bean are one and the same thing. It is a legume, and, in our opinion, will yield more grain per acre than the cow pea. Some varieties of it, such as the black, which mature comparatively early and do not grow so vigorously as the Mammoth Yellow and the Medium Green, will make a fine quality of hay, and one which is easier to cure than that from the cow pea. When planting for grain you will find the two varieties just mentioned among the best to plant for large yields. The black is an excellent variety of soy bean for general cultivation. The grain can be fed to a great variety of live stock, but being rich in protein, it should be mixed with corn or other concentrates. The hay will be readily eaten by all classes of live stock. Farmers in the South should cultivate the soy bean extensively. It makes a much richer hay than timothy and can be fed under rational conditions as a substitute for a portion of the grain now fed to beef and dairy cattle. It will produce more pounds of beef per acre when fed in the form of hay than would be obtained from an acre of corn. When grazed it should make from 400 to 600 or more pounds of pork per acre. Soy beans contain an average of 29.6 per cent of digestible protein as compared with 18.3 for cow peas, fifteen to sixteen for bran and 37.2 for cotton seed meal. You will see that it is one of the richest foodstuffs the farmer can grow and will aid in balancing up rations in which corn predominates.

ALFALFA.

By J. H. Connell.

With the exception of cotton, there is no one plant that will thrive in so many States in the South as will alfalfa. Its penetrating roots, reaching

to a depth of ten or twenty feet, seem specially made for the purpose of probing the dry and porous soils of the South. The valuable hay growing at the rate of six tons to the acre during a single season gives eloquent testimony of the Southern sun when expended upon this plant of continuous growth. The March winds that herald the coming of spring find that alfalfa is ahead of them with tender shoot and verdant leaf, covering the moist soils before the native grass and weeds shoot forth. The frosts of early winter leave alfalfa in possession, with only a leaf chilled here and there, and without discouragement to the live stock that graze across verdant pastures in December.

Without irrigation alfalfa grows apace on all of the fertile lands of the South. Upon the uplands three tons per acre are secured with certainty. On the lowlands as much as six tons are had during the most favorable seasons. The yield per acre depends somewhat upon the treatment of the crop by the farmer. If the meadows are grazed as well as mowed, the yield of hay will of course be diminished. Winter grazing is most harmful to the yield of hay. On the other hand, the most productive system consists in keeping stock off the fields at all seasons, and cultivating the land with harrow between mowings, in order that the bare and exposed soil may not have all of its moisture driven from it during hot weather.

The influence of cultivation upon the alfalfa crop is remarkable, but without cultivation or irrigation the yield of hay per acre upon fairly fertile soils exceeds the crops grown upon the irrigated lands of Colorado and Utah. This fact is rendered possible by the long and favorable growing seasons in this lower latitude.

Some Southern Soils.

Rich alluvial lands lying along the river valleys and the creeks are the best suited to alfalfa, but the heavy black prairies and the chocolate loams of the uplands will maintain alfalfa for many years without re-seeding, and without a shrinkage in the annual crop of hay secured from such soils. The river and valley lands have a compensating disadvantage in that they sometimes overflow to such an extent as to injure the stand, necessitating replanting in spots. In this respect, however, alfalfa is not more sensitive than other crops. It will endure overflow quite as long as will corn or cotton. But we sometimes hear an expression of disappointment because it is not both a drouth-resisting and water-loving plant as well.

Any of the worn or light post oak soils of the South will grow alfalfa profitably if a crop of cow peas has been grown upon the land just before seeding the alfalfa. A light application of stable manure will have the same effect.

When to Sow.

Either fall or spring seeding is successful, provided one sows early enough in fall to permit the plants to harden before winter begins, or sows early enough in spring to permit the plants to harden before the hot summer sun of May and June draws out the surface moisture. September and October are the best months for fall seeding; March and April for spring seeding.

When alfalfa plants first come through the land and try to establish themselves they are very small and tender. At this time they need a good seed bed, moist, porous and cool. It is advisable, therefore, that the land should be plowed and re-plowed, and then harrowed more than once before the seed is put in the gound. Proper seeding is three-fourths of the battle in sowing alfalfa. If well sown, the crop will last for ten, twenty or thirty years. There is one field of alfalfa in North Texas known to have been seeded thirty years ago, which is still producing hay. When the land has been thoroughly prepared by plowing it from six to fifteen inches deep, the deeper the better for stiff soils, and thoroughly harrowed and when a rain has settled the ground, plant your seed at the rate of fifteen or twenty pounds per acre, broadcasting them over the surface and cover by harrowing in. If weeds begin to grow freely while the alfalfa is young, mow them down. This will not discourage alfalfa.

So many people are inclined to plant oats and wheat with alfalfa as a "nurse crop." This is a serious mistake. When grain has been taken off the land in late spring, the hot sun burns the tender alfalfa, the land loses its moisture quickly, and the stand of alfalfa disappears. Alfalfa is good enough to plant alone. It thrives best without a nurse crop, and will richly repay careful plowing and seeding at a seasonable time.

The Value of Alfalfa.

Work horses and mules have tilled good crops of corn and cotton through an entire spring and summer when fed upon alfalfa alone, without injury to such stock. The leaves are greedily eaten by poultry during the winter time, and the hay, when well cured, is relished by hogs, preventing any necessity for large amounts of grain feed, because of its nourishing qualities. Its purple blooms furnish the richest and most abundant supply of honey during the spring and fall. Its roots subsoil the land, draining it thoroughly in some cases, and furnishing it with a rich supply of fertilizing elements in all instances. The plant feeds upon the air in the soil, as well as upon the soil itself, and in this way stores large amounts of plant food in the land for its own use and for crops that come after it.

Would it not be a great blessing to grow alfalfa extensively upon the valley lands and the worn cotton uplands of the South, restoring to such soils the plant food lost by years of exposure to washing rains and the repeated removal of crops which have been sold from the cotton plantations of the South.

Some Alfalfa Don'ts.

A successful alfalfa grower gives the following don'ts to prospective experimenters with this useful plant:

Don't sow any "nurse crop."

Don't sow on freshly plowed land, no matter how nicely prepared.

Don't let weeds or grass get over six inches high without clipping.

Don't clip or mow when wet with rain or dew. Don't let it stand if turning yellow; cut it.

Don't sow old seed.

Don't sow less than twenty-five pounds per acre, one-half each way.

Don't sow on land that will not raise 100 bushels of potatoes per acre.

Don't sow twenty-five acres, sow five.

Don't pasture it.

Don't put any of the rotten manure anywhere but on your alfalfa plot.

Don't depend on "culture" cakes or soil from some distant field.

Don't let water ever stand on it.

Don't let it go if a thin stand; disc in more seed.

Don't be afraid you will kill it.

Don't replow the land; disc it.

Don't wait for it to "stool;" it never does.

Don't try to cut hay until it takes the field.

Don't sow on any land not well underdrained. There are two varieties—yellow and purple bloom—otherwise the same.

Don't sow the yellow.

Don't give it up.

FRUIT AND VEGETABLE CRATE FACTORIES.

Wherever there is sufficient fruit and truck grown at any point, the establishment of a box and crate factory adds to the convenience and value of the location. The readiness with which boxes may be secured causes more fruit and truck to be grown and it also induces new settlers to locate, for everyone recognizes quickly all the facilities at hand in the way of canning factories, evaporators, dairies and box and crate factories, as all of these industries flourish best where the most profits can be obtained.

Most fruit and truck growers labor under the impression that canning factories, broom factories, box and crate factories are costly affairs, requiring large capital and vast experience to operate, when as a matter of fact a box and crate factory, outside the boiler and engine, all of the machinery from the log to the finished box or crate may be bought for less than five hundred dollars and wherever fruit and truck is grown and where timber may be close by, the erection of a box and crate factory is as safe a proposition as any other business enterprise. Upon application to our office we will cheerfully give all further information how to operate a box and crate factory, cost of plant and where to get the machinery. At most points the same boiler and engine used in the cotton gin and canning factories could be used for the box and crate factory, when otherwise, at certain times, both would be idle. What it needs is a live and up-to-date Fruit and Truck Growers' Association at the shipping points to grasp all of these opportunities, which means economy, profit and success in any community; the saving of freight charges alone on the empties may always be considered quite an item.

Timber for Boxes and Crates.

The timber mostly used for crates and boxes are the poplar, sweet gum, cottonwood and ash; for cheaper grades of boxes much other timber may be used. Poplar being a soft and dense wood is suitable for strawberry crates and quarts; the gum being tough and elastic is most suitable for baskets and heavier crates; on account of the odor of pine it is used but little except in large crates like cabbage crates and the cheaper grade of vegetable boxes.

TANNING.

As every farmer or gardener may have occasion, where he desires to tan animal hides or skins for home use, we give below a few useful receipts.:

In order to get the best results in tanning skins with the hair on, for rugs or for any other purpose, the skins should first be thoroughly washed and all flesh from the inner surface should be be removed. The hair or wool should be cleaned with warm water and soft soap, and rinse well. Take one-half pound each common salt and ground alum and one ounce of borax, dissolve this mixture in hot water and add sufficient rye meal to make a thick paste; spread this paste on the fleshy side of the skin.

Fold the skin lengthwise with the flesh side in, the skin being quite moist; then put in an airy and shady place for about ten days or two

weeks. Shake the skin well and remove the paste from the surface, wash and dry thoroughly. If the skin is a heavy one a second similar application of salt and alum may be made.

Afterwards stretch the skin with the hands or over a beam, and use a blunt knife on the flesh side.

Mats.

To prepare sheepskin for mats: Make a strong lather with hot water and soap, then let stand until cold; wash the skin in this mixture, carefully squeezing out all the dirt from the wool, then rinse the skin in cold water until all soap is taken out. In two gallons of hot water dissolve one pound each of salt and alum, put the skin into a tub sufficient to cover it, and let it remain in this mixture for twelve hours, then hang over a pole to drain. When well drained stretch carefully on a board to dry, and stretch several times while drying. When nearly dry, sprinkle one ounce each of finely pulverized alum and salt peter on the flesh side, rubbing in well. If the wool is not firm on the skin, let remain a day or two, then rub again with alum. Fold the skin lengthwise with the flesh side in, hang in shade for two or three days, turning them over each day till quite dry. With a blunt knife scrape the flesh side and rub it well with pumice or rotten stone.

Fur skins are tanned by first removing all the useless parts and softening the skin by soaking; then remove the fatty matter from the inside and soak it in warm water for an hour. Mix equal parts of borax, salt peter and sulphate of soda in the proportion of about one-half ounce of each for each skin, add sufficient water to make a thin paste, spread this with a brush over the inside of the skin, applying more to the thicker parts, double the skin flesh side in and put in a cool place. After remaining for twenty-four hours wash the skin clean, and apply in same manner a mixture of two ounces sal soda, one ounce of borax and four ounces hard white soap, melted together slowly without being allowed to boil; then fold together and put in a warm place for twenty-four hours. Dissolve eight ounces of alum, sixteen ounces of salt and four ounces of saleratus in sufficient hot rain water to saturate the skin; when cool enough not to scald the hands, soak the skin in it for twelve hours, then wring out and hang it up to dry. When dry repeat the soaking and drying two to three times till the skin is sufficiently soft. Smooth the inside with fine sandpaper and pumice stone.

PART VIII.

POULTRY IN AN EGGSHELL.

THE POULTRY YARD.

The industry of conducting commercial poultry yards of fancy breeds, or either the common barnyard fowl, is so well known throughout our land there is hardly any need to dwell on that particular part; it is sufficient to say that the American hen is the most valuable of all birds, and would we consider faithfulness, usefulness and profits the only points, the hen would well be entitled to the place of honor as our national bird.

The early crow of the cock is the symbol of contentment and sweet home, the lusty cackle of the hen, full of thrift and promise.

The industry of raising poultry or production of eggs can never be monopolized, for it requires no capital to invest. A dozen eggs or less and a willing hen starts the yard on a small, but sure basis and future care of the owner does the rest.

In the year 1900, when the last census was taken, the United States possessed on its farms, cities and suburbs 7,000,000 turkeys, 6,000,000 geese, 5,000,000 ducks and 233,500,000 chickens, nearly four heads of poultry per capita.

The value of the poultry was $136,891,977. The production of eggs had a commercial value of $144,000,000.

In 1902 we exported to Great Britain $331,000 worth of eggs and a like amount to Cuba and other foreign countries.

POULTRY FARMING.

The poultry industry of the State of Kansas is occupying an important place in the realms of agriculture. Within the State already over $9,000,000 worth of poultry products are sold each year, not considering the immense consumption within the State. During the year of 1906 the poultry products were increased 25 per cent over those of 1905, and the prospects for the year of 1907 indicate even a greater increase.

Kansas has led in the production per capita of poultry and eggs for many years. According to the census of 1900 there was $9.32 worth of poultry and eggs sold for every man and woman in the State. Iowa comes next with $8.74. The value of the poultry products is one-twelfth of the total farming income. Poultry, as in the case of dairying, is a very profitable, independent industry, but it can also be combined in many cases, with exceedingly great profits, with other classes of farming. To show what classes

of farming poultry farming is generally combined with statistics are given below from the department of agriculture, which show the value of poultry products produced in connection with the different kinds of farming:

Kinds of farming and value of poultry products per farm: Dairy farming, $38.69; live stock feeding $23.09; hay and grain farming, $18.36; fruit farming, $18.00; vegetable farming, $15.60.

Poultry farming is generally taken up by men of stable industry. As people become more wealthy and better educated, the coarser articles of diet are supplanted by more wholesome and palatable foods. Thus it is that the consumption of pork per capita is decreasing while the amount of butter and eggs eaten by the average American is nearly twice as great as they were twenty years ago. For this reason poultry raising is carried on more extensively in progressive communities where the population is quite dense and where people live with the more modern conveniences.

General poultry raising, either in the commercial or barnyard, is attended with both success and failures. Failures are more frequently experienced where poultry is more or less confined or where too large a flock is kept on the same premises; the natural instinct of the fowls is a desire to roam and search for food rather than feed in abundance and close confinement. Many of the poultry diseases may be traced to lack of proper exercise, pure food and unclean habitations of the fowls, for all contagious diseases appear in the most virulent form only in close quarters.

POULTRY RAISING AND EGG PRODUCTION.

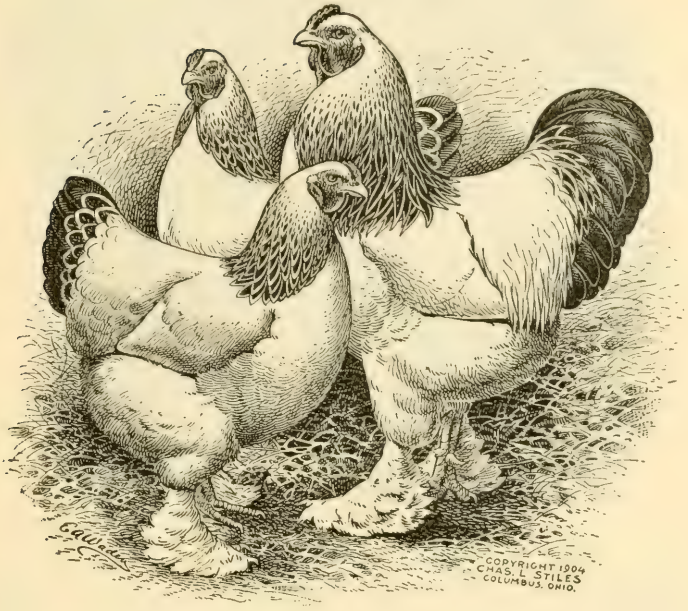
Poultry raising for profit may be divided into three classes:

First—The growing of fancy fowls for breeding purposes.

Second—The growing of poultry for meat and eating purposes.

Third—The growing and keeping of poultry for egg production.

It must be understood by our readers that in publishing this book, the "Modern Guide," where so many subjects are treated, we are forced to limit the amount of space to each subject. We consider poultry growing the most important of all additions to farming, orcharding and truck growing, not alone for the profit in poultry growing so much as the usefulness of the fowls in checking and subduing insect life on the farm, orchard or garden; yet all of our writing will be to the point, covering only such points most important to success.

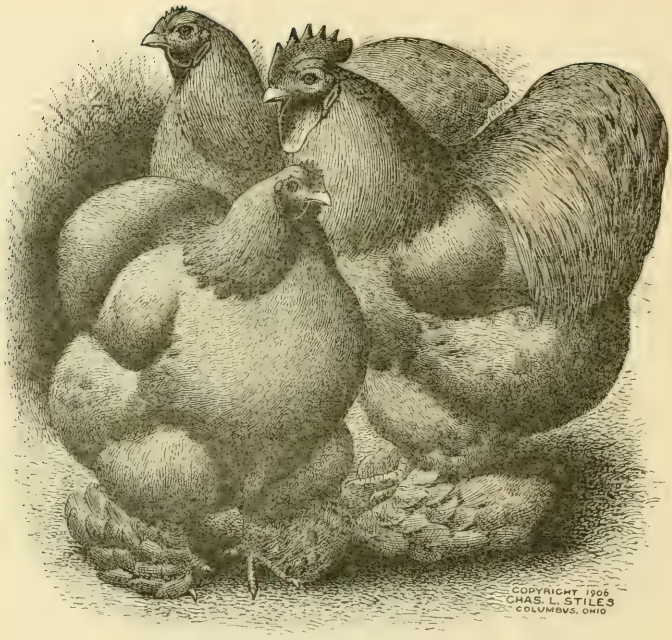


IDEAL LIGHT BRAHMA TRIO.

This illustration shows the Light Brahma true to life. Where this magnificent bird is known we need say but little in its behalf. They are the largest breed of fowls. Hardy, gentle and handsome, good winter layers, content in small yards and rarely attempt to fly. Standard weights are: cock 12 pounds, cockerel 10 pounds, hen 9½ pounds and pullet 8 pounds.

CHICKEN EXPERIENCES.

All summer and spring my chicken house has been filled with mites They became so bad that the sitting hens left the nests, and many of the fowls refused to roost in the hen house. I tried nearly everything until I heard of the following very simple remedy. You know that mites spend the day in cracks, holes and slivers in the roost. One morning in each week I went over the hen house with a common machine oil can filled with kerosene and squirted the cracks and holes full of oil. The result



IDEAL BUFF COCHIN TRIO.

No lover of large fowls ever saw a flock of well-bred Buff Cochins without admiring them. Their massive bodies, heavily coated with feathers of a rich buff or golden color, make them very attractive. They are one of our oldest Asiatic varieties, breed wonderfully true to color, and are considered the most hardy and prolific fowl of their class. Good winter layers, well fitted for cold climates. A three-foot fence will keep them. But, owing to their immense size they do not, as a rule, make good sitters and mothers. Their standard weights are: cocks 11 pounds, hens 8½ pounds.

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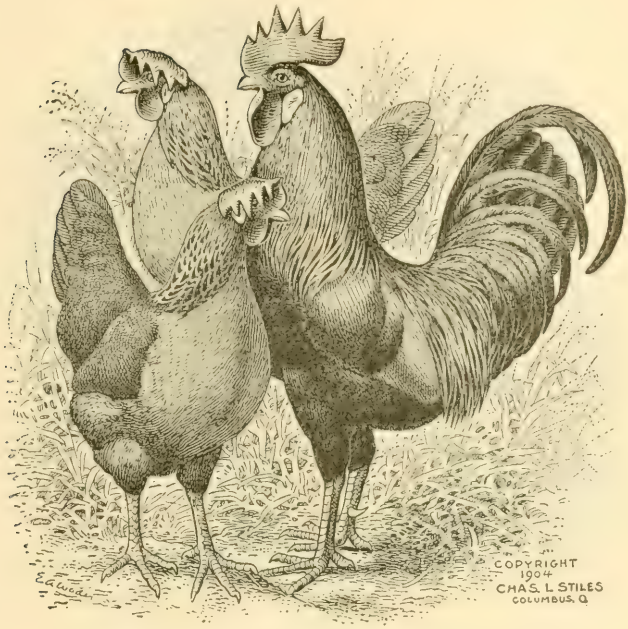
was that in three weeks there was not a mite to be seen, and the fowls are doing better now than they ever did before. I should have said that before I applied the oil the first time I went all over the interior of the house and washed the walls and roosts with boiling soap suds and then gave them a coat of whitewash. This destroyed a great many of the insects, but those I missed and those hatched from the eggs were put out of commission by the coal oil.—H. B. Speck.



IDEAL SINGLE COMB BROWN LEGHORN TRIO.

For vitality and egg production the Brown Leghorn stands at the head. No other breed will lay so many eggs on as little feed. Non-sitters, easy to mature, pullets begin laying at four and five months old. Bear confinement well, but are great foragers; active on foot and wing, and it is seldom a hawk can catch them. Their bodies, though small compared with the Asiatic breed, are very plump and make delicious eating, having that gamey lobes, and rich plumage make them truly beautiful. Leghorns are not given a weight in standard. A well matured male weighs from 5 to 6 pounds, hens from 3½ to 5 pounds.

GREEN FOOD FOR POULTRY.

Everyone with room to keep chickens should raise a supply of green food for them. Lettuce is one of the best green feeds and about the easiest to raise, and a small plot will grow enough for a good-sized flock of chickens. A poultry journal tells of a friend who has only about four city lots that keeps a hundred or more chickens and finds room to sow rape in one or two of his yards, and, after it gets six inches high, which is only a short time, he turns his chickens in and lets them strip it. Then they are turned

IDEAL ROSE COMB BROWN LEGHORN TRIO.

The Rose and Single Comb varieties are exactly alike in every feature except the comb. They are very hardy and the chicks are easily reared on free range; in fact, before you are aware of it, they are little vestpocket editions of their brilliant parents; great foragers, and in summer require but little feed. Their low, compact combs are not easily frozen, which makes them more desirable in our Northern clime than the single comb variety. They breed very true to feather and form and are fine layers.

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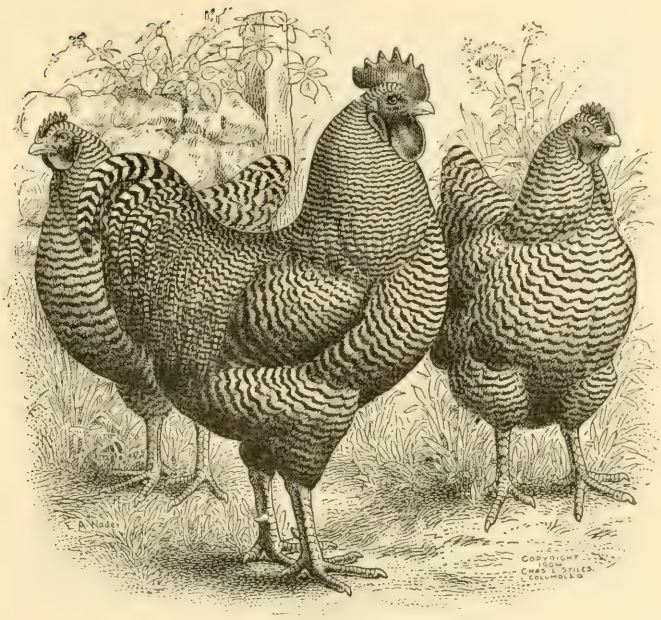
into another yard which has been sown to rape, and while they are eating at that the first rape starts up as green as ever. Why not sow a rape patch on the farm this spring for green feed through the hot, dry summer months.

MARKING YOUNG CHICKENS.

If you want to mark your young chickens when they first come from the nest, get a shoe punch, spread out the foot and punch a hole in the web between the toes. Several broods may be marked in this way, so that each



IDEAL BARRED PLYMOUTH ROCK TRIO.

The Barred Plymouth Rocks are so well known that a description of them is deemed unnecessary. Suffice it to say they have held their own against all comers, and are today justly termed "The Farmers' Favorite," all-purpose fowl. Easy to raise, good foragers and are ready sellers in any market. Standard weights are: cock 9½ pounds, hen 7½ pounds.

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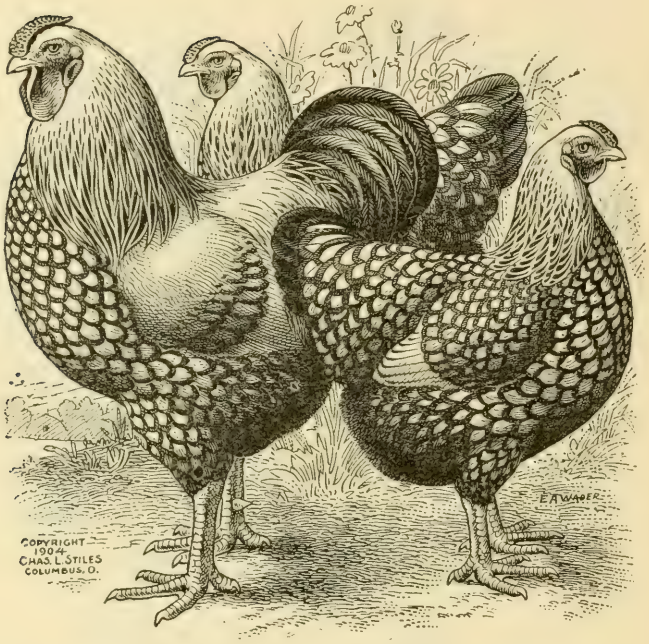
brood may be readily distinguished. One could be marked in the extreme left web, another in the right foot on the left side, another in the right web of the left foot, and so on.

This system of marking in no wise injures the chickens so marked, nor is it painful to it. And, if there is no punch handy, the marking can be done with a knife, splitting the web instead of punching it; but the punch is the best.—Southern Cultivator.

FRUIT AND POULTRY.

The combining of fruit with poultry is an advantage to both branches of industry. The trees provide shade for the chickens during the hot months, when it is so very essential to the comfort and growth of the chicks. Then the hens and chicks will be at work constantly as long as



IDEAL SILVER LACED WYANDOTTE TRIO.

The useful qualities of the Silver Laced Wyandotte goes without repeating. The American Wyandotte Club is one of the largest poultry organizations, which alone explains the standing of this variety of fowl in the estimation of the poultry fanciers' fraternity. They are beautiful in plumage, have bright yellow legs and skin, low rose comb, which makes them adapted to cold climates, plump bodies. Cocks weigh 8½ pounds, hens one pound less, and as layers are the best of all middle-size fowls. For table qualities they are not excelled.

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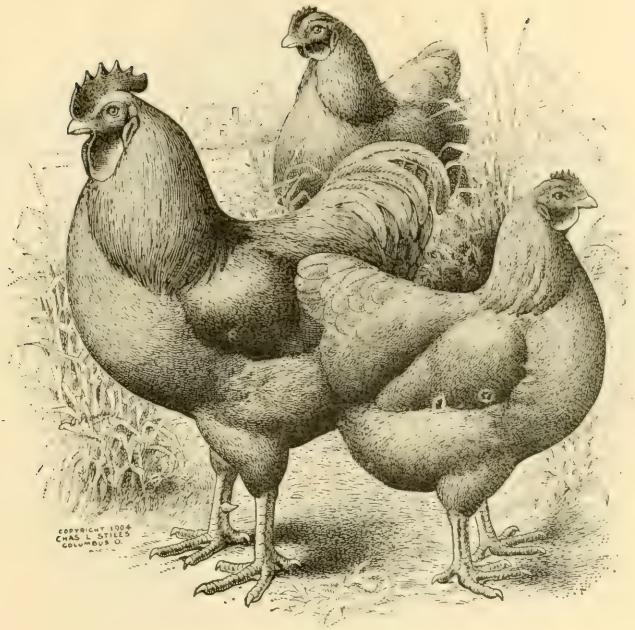
there is a bug or worm to be found at the roots of the trees, scratching and digging, and getting the very essential exercise, as well as ridding the trees of their enemies. I have known plum and pear trees to bear where chickens were kept under them, when trees without the chicken accompaniment failed entirely.

There are several reasons for this. First, and very essential, of course, is the riddance of bugs and insects of all kinds. Another and very important result, and one not generally considered in this connection, is the enriching from the droppings. Trees thus treated will not only bear fruit



IDEAL BUFF PLYMOUTH ROCK TRIO.

The Buff Plymouth Rock is a most beautiful fowl. They are the same size, style and shape as their barred cousins. Legs, beak and skin are a deep orange yellow, while their combs, wattles and ear lobes are a bright red, which, with their rich buff plumage, make a very pretty contrast. They are one of the latest additions to the standard of perfection.

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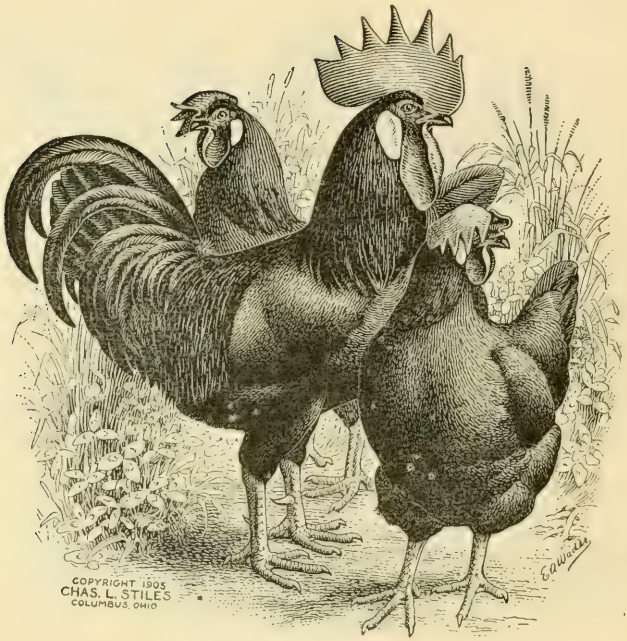
when other trees do not, but will yield double the quantity and be of a very superior quality, free from blemishes and defects, not only on the outside, but at the seed.

Then we have the pleasure and satisfaction of a beautiful poultry yard, studded with trees, to look upon, rather than the unsightly, barren grounds as usually seen.

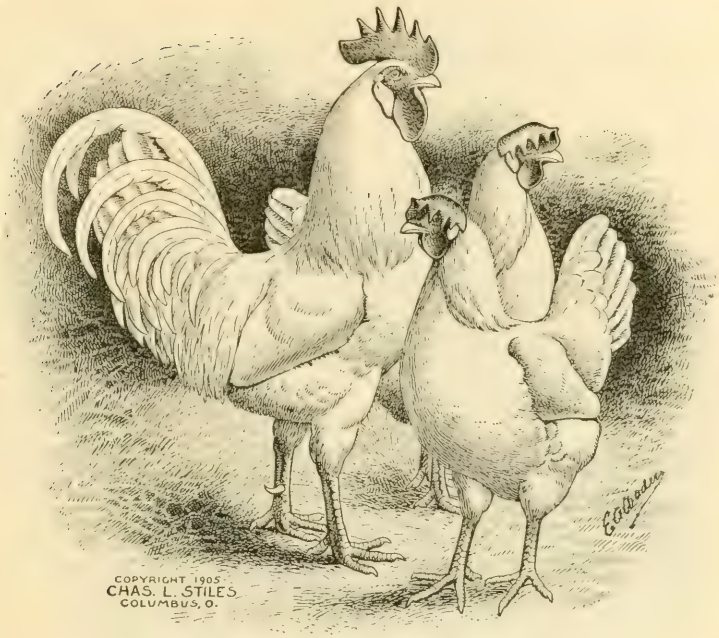
There is no question or doubt about the problem that you need wait to consider. It will work, and work to your satisfaction, if you go about it in a business-like manner. Plums and peaches are especially adapted to the poultry yard and its consideration. It is not advisable, however, to allow the chickens to roost in the trees, as the droppings upon the limbs tend to scald the bark and make it peel off.



IDEAL MINORCA TRIO.

Minorcas are very beautiful in appearance, carrying style and elegance equaled by no other black variety. They have long bodies, large red combs, large white ear lobes which show off to very best advantage against their glossy black plumage, and what's more, are layers of the largest white eggs of any variety. Under ordinary conditions they start laying about March 1st, and lay continually until about September 1st, and by feeding for winter eggs, and keeping in very warm house, make best of winter layers.

One wishing for black plumage birds cannot get better returns or more satisfaction than from Black Minorcas. As table fowls, many insist on having white skin birds, claiming the meat of same excels in juiciness and flavor. Minorcas are certainly fine flavored, and are really too pretty to eat. They do best when hatched in April, May and June, and, being warm climate birds, need the heat to bring them to quick development. They stand the coldest winter weather, nature providing them with great flow of blood, keeping combs and wattles from frosting. Standard weight of males 7 to 10 pounds, females 5½ to 7 pounds.



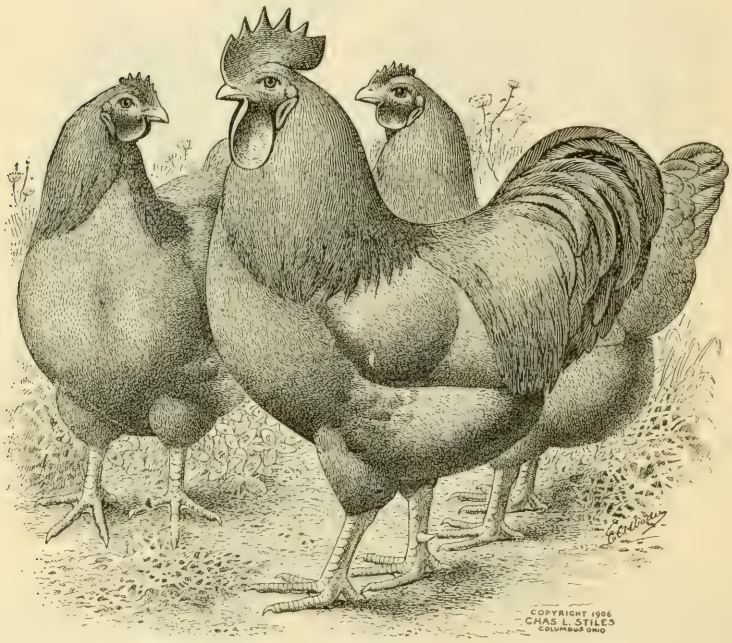
IDEAL SINGLE COMB LEGHORN TRIO.

Single Comb White Leghorns, known the world over as the greatest of egg producers. Layers of good sized eggs from medium-sized birds. Very active, easy to raise, quick to mature, non-sitters, as good layers at two to five years old as other varieties after the first year. Weights. males 5 to 7 pounds, females 4 to 5½ pounds.

TEST AGE OF FOWLS.

A rooster's age is determined by the size of his spurs. If they are long he is "antique." If there is a small button on the ankle where the spurs come later he is a young bird. Ducks are invariably judged by the under lip of the bill. If a dressed duck will sustain its weight by its under bill, lay it back and try another, for there is no telling how old it is, certainly too old to be real tender. But if the bill snaps easily it is a young bird. Gobblers are told by their spurs, the same as roosters, the age of the hen turkey being determined by the length of its beard. Aside from the test applied to ducks, there is one infallible rule which can be applied with

BRIEF MENTION OF THE ORPINGTONS.



IDEAL BUFF ORPINGTON TRIO.

The Orpington is a very popular fowl, and well they should be, for there is no fowl that will outclass them for a strictly first-class utility breed. You may take it for eggs, and it has but few equals, and for flesh and quick development it has no superiors. It is becoming so popular that it stands at the head of the list and almost alone. As a fancier's fowl it will take care of itself and today they are as strong a class as any in our leading exhibitions. Too much cannot be said of this most beautiful fowl. What is more handsome than the Orpingtons, when they are bred to the highest state of perfection? We meet many specimens at the leading shows these days that almost beggar description. Surely the Buff Orpinton is a wonderful addition to the long list of our fine fowls. There is no breed that has gained greater popularity in so short a time, than have the Buff Orpington, and truly they deserve all that is accorded them. In size the Orp-

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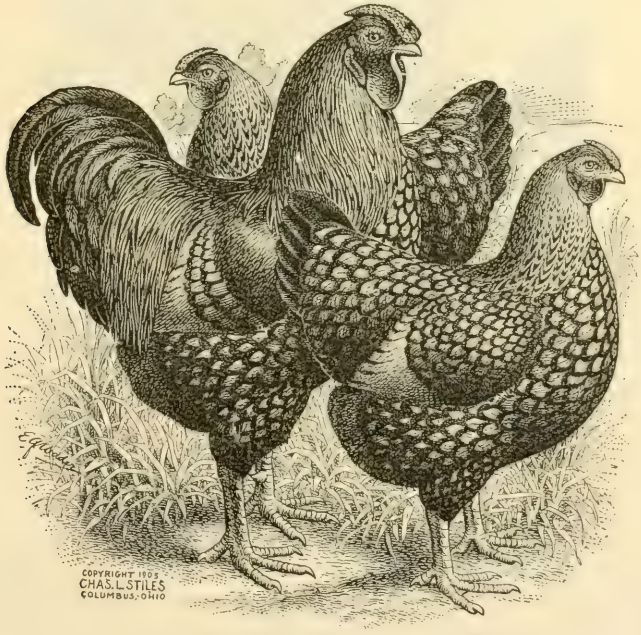
safety in all cases. The back part of the breastbone can be bent easily in a young fowl. If it is sharp and hard and refuses to yield to pressure from your thumb it is an old bird.

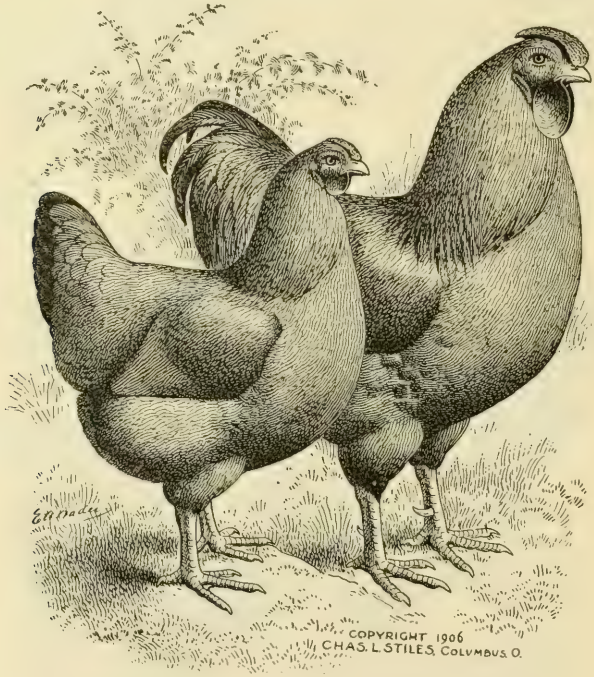
ington stands alongside of our heaviest breeds, and when it comes to laying they need not blush for their credit in this respect, for they are of such an active disposition, scratching and foraging so freely that eggs must necessarily come; and they do come in pleasing abundance, nearly all the year around. If they have to be yarded, they will make the most of their opportunities and rest contented with a four-foot inclosure. For its size it is a very moderate eater. The chicks are very hardly, and grow rapidly, feather quickly, and are ready for the market at any age. They can be bred to great size and cockerels are grown to ten pounds with little effort. They come right along from shell to maturity, at all stages, from large enough for a broiler to a roaster, they are plump and ready for the knife. To appreciate the many good qualities of the Orpingtons, one should raise them, for he will then become acquainted with their beauty, gentle nature, and productiveness. They are a fowl that merits all the good things that breeders claim for them.



IDEAL GOLDEN WYANDOTTE TRIO.

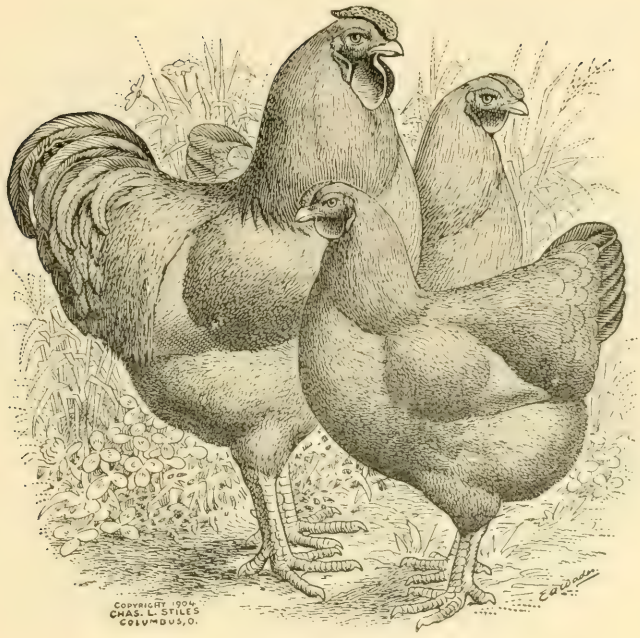
There are few birds which excel the Ideal Golden Wyandotte. They have low rose combs which never freeze, are exceptionally good layers, and

are large enough to be good market birds. The hens make good mothers. The chicks are hardy and mature early, and when it comes to beauty no bird of paradise can excel a good Golden Wyandotte. It is difficult to decide which is the more beautiful, the male or the female. Personally, I prefer the female with her deep golden-bay centers, and each feather edged with a narrow strip of black. Don't be afraid to try Goldens; if you raise a good bird you can always sell them at a good price. The Golden of today is a bird of which we ought to be proud. The person who produces good birds can always find ready sale for them. Give the Goldens a trial and be convinced that they are one of the best of all purpose breeds in existence.



IDEAL ROSE COMB RHODE ISLAND REDS.

The Rhole Island Reds are most beautiful and prolific birds, equally superior for laying eggs, as well as for market for a table fowl. These birds should be introduced in the South, as they are ideal birds for warm climate and good layers in the winter. Owing to their pronounced character of cleanliness are remarkably free from disease. The hens are good sitters and mothers, and we can recommend these birds for an all-'round good variety.



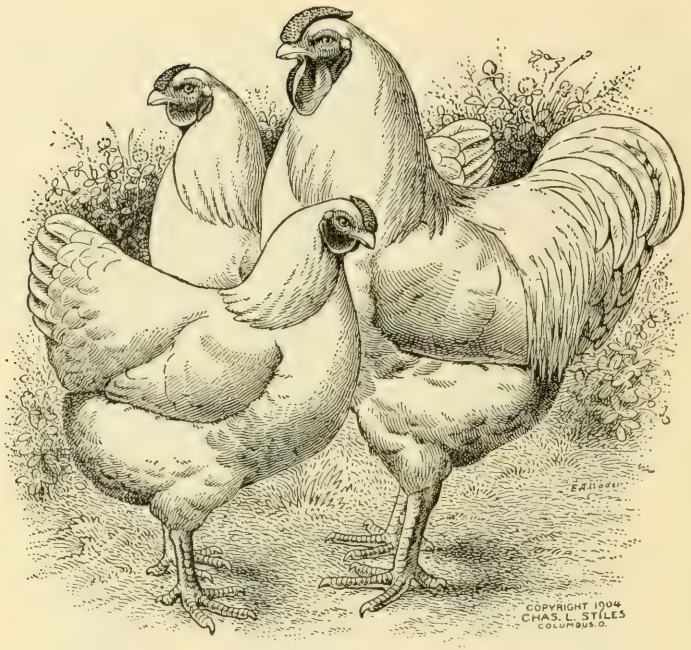
IDEAL BUFF WYANDOTTE TRIO.

The Wyandottes are becoming one of the most popular breeds, and aside from the Whites, the Buffs are the favorites. I breed a few because I like them and desire to keep in touch with the most perfect buff color, in order that I may judge them correctly at the shows. And then, these buff varieties do make the most agreeable sitters, sitting where you want them, and as mothers will hover and care for every chicken on the farm. They are prolific layers of nice brown-shelled eggs, and, when used for incubation during the spring and summer, will lay abundantly during the fall, when eggs are scarce and high.

CLOVER FOR CHICKS.

Every reader has found that chickens need green feed during the winter, but probably all do not know that the best substitute for green feed is well-cured clover hay. In a few weeks it will be time to cut and cure this hay for the poultry in the winter. The second crop is much better for the birds than the first, for the simple reason that it does not have to lay in the stack so long. Neither is it so large and woody when cut. It may also contain a great deal of seed, a very valuable adjunct to any feed.

When it is intended to cut clover for the poultry, the first crop should be



IDEAL WHITE WYANDOTTE TRIO.

The White Wyandotte is strictly an American breed and the most popular fowl of today.

The origin of this variety is claimed to be from an albino from the Silver Wyandotte family; the males were first to appear and these were mated with White Rocks, White Hamburgs and White Leghorns, and later to Light Brahma hens.

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cut for hay as soon as possible so the second crop will get a start before the summer rains cease and the weather turns dry. When the second crop of clover is ready to bloom it should be cut. Some advise waiting until it is in bloom, but we have found that better results are realized by cutting it while the leaves and stems are tender, unless it is desired to have the blooms full of seed.

As soon as the grass is cut, remove it to the shade where it should be spread till it has cured sufficiently to be stored in the hay mow. If the weather is unsettled it should be cured under cover, an empty corn crib being an ideal place for the curing. Clover cured in the shade is much better for poultry than that which is allowed to become partially bleached.

Thus it will be seen the present White Wyandottes are composite in their make-up and a wonderful bird we have from this mixed ancestry.

With their pure white plumage, well-rounded, compact bodies, nice clean, yellow legs, low, well-set rose comb, and a deep bay eye, we have a bird for the eye to feast upon.

Its laying qualities can't be beat, laying in coldest of weather, when eggs are high and the Leghorns are froze up. Surpasses the Rocks by far.

In maturity, we have a finished bird in six months. Have had pullets laying before five months old.

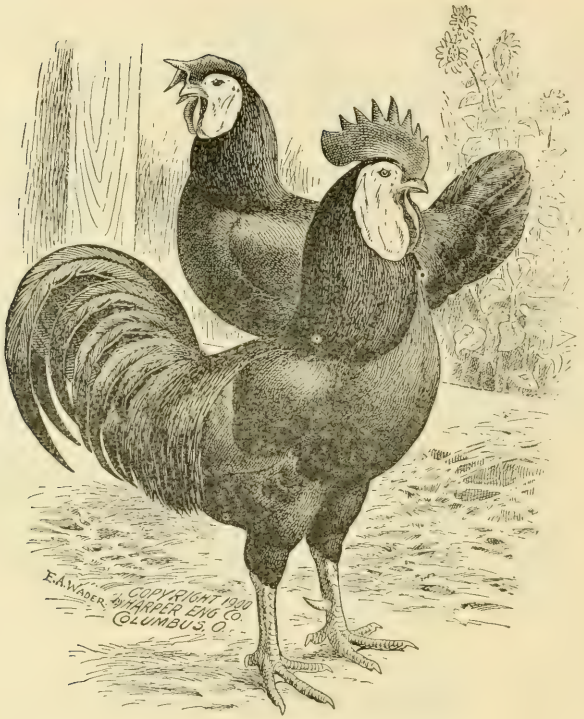
The popularity of the White Wyandotte has become so great, the great call for show birds, that the demand is far ahead of the supply. A really good White Wyandotte is as salable as a $20.00 gold piece.

For a market fowl they head the list, nice plump rounded bodies, with yellow skin, and can be brought to broiler age at eight to twelve weeks. The standard weight sare as follows: Cocks, 8½ pounds; cockerel, 7½ pounds; hen, 6½ pounds; pullet, 5½ pounds.

The term cock means a male over a year old; cockerel, male under 1 year old; hen, female over 1 year old, and pullet, female under 1 year old.

CONDIMENTAL FEEDS.

After the hens have passed through the six to eight weeks laying period of the late winter, the three to six weeks incubation, and then five to eight weeks of brooding, their flesh and vigor are both run down. They need some kind of feed which will build up the system and start them to laying with flesh. It is for this purpose that the condimental feeds are fed. Condiments may be profitably used if fed judiciously any time after the later part of April. Charcoal may not be, strictly speaking, a condimental feed, yet it should be fed quite heavily at this time to the hens which have just brought off a brood of chickens. Pepper is another ingredient that can be taken profitably into the ration. Only a little of it should be given, but the little is necessary to tone up the system. Feed not more than a fourth of a teaspoonful a week to each bird. Another feed beneficial at this time is made up of the following: Anise seed, two ounces; sulphur, two ounces; cayenne pepper, five ounces; ginger, six ounces; salt, one ounce; carbonate of iron, two ounces. Feed a teaspoonful in the soft feed for each dozen hens. Mix well with the feed so that each will get her share. Shut the chicks away from the hens when these feeds are given the latter.



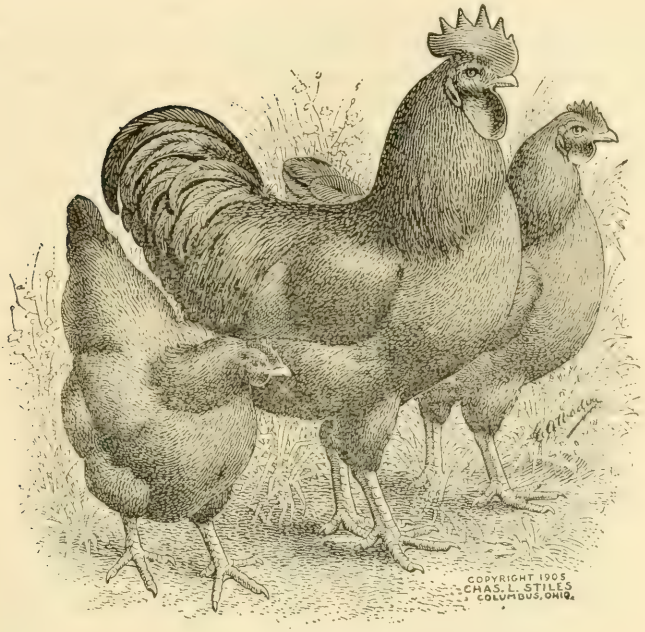
IDEAL WHITE-FACED BLACK SPANISH.

The White Faced Black Spanish fowl is one of our oldest varieties of poultry, and while not as extensively bred as many other varieties, it possesses merit of a high order, both as a fancy and utility fowl.

FEEDING FOR SIZE.

Some may be intersted in knowing how we feed for size. We induce exercise, but feed plentifully and make the diet as varied as possible. Milk, meat, grain and green food form the main basis of our feeding. Skimmed milk at 6 cents per gallon is a cheap food, and we also use quantities of thick sour milk. Practically no corn is fed our young stock until six months old. Bran and middlings are a daily portion of the diet and are kept before the chicks at all times in the dry state, but sometimes we moisten this mixture for a change. Have found whole oats soaked in skim milk a great growth producer, but they should not be fed until chicks reach the age of six weeks. Charcoal, grit and cool water should not be forgotten.

RHODE ISLAND REDS.



IDEAL RHODE ISLAND RED TRIO.

The outcome of the last meeting of the American Poultry Association, so far as the Rhode Island Reds are concerned, was most fortunate. The Single-Comb variety was admitted at Rochester, and was satisfied with gaining admission to the Standard. A year of storm, contention and determination to win has made them so well known throughout the world as to give them an unusual boom.

The Rhode Island Reds are general purpose fowls of great merit. They have strength and vigor, are of quick growth, easily grown, lay a goodly number of fine-size eggs having the brown shell, and in every way except in perfect regularity of breeding as to feather, are attractive birds.

In appearance, to the uneducated, the Single-Comb Rhode Island Red would be said to resemble the Plymouth Rock; the Rose-Comb Rhode Island Red to resemble the Wyandotte. While this is not exactly true, it not very far distance from the fact, generally speaking. The Single-Comb Rhode Island Red has, to the casual observer, very many of the same characteristics as the Plymouth Rock. They are large-size fowls, and should be of a deep cherry-red for a male and a brownish red or snuff color for the female. Both the Single and Rose-Comb varieties should have the same

general formation and make up, the one with the single comb, the other with a comb like the Wyandotte comb.

There are great possibilities for these two varieties as exhibition fowls. The greatest future, however, is claimed for them along the lines of egg-producing, market poultry. It is claimed that they are naturally great egg producers and always in perfect condition for the market or the table. Within reason too much cannot be said of their high qualities, but it is foolish and an extravagant statement for any one to maintain that they are much better than any other kind of fowls. They are as good for the purpose as the Plymouth Rocks or the Wyandottes. Thety are very vigorous and attractive in every way as good utility purpose fowls. We do not think that their most enthusiastic admirers would claim them to be better than the Plymouth Rocks and Wyandottes. Be just in the estimation of the good qualities of all poultry, but do not claim unusual merit over others.

We have just read an article in an agricultural paper which pictures the Rhode Island Red in such a light as to lead the reader to believe that a few dollars invested in them would bring ten times as much as double the amount invested in any other poultry. Such statements have done considerable harm to the utility flocks upon the farms. Farmers have been induced to purchase some of every breed that comes along and mix it in with their farm flocks. The result has been poorly shaped and colored poultry, with irregularly shaped and badly colored eggs. It is impossible to intermingle the blood of so many varieties without interfering with the general make up of the product and detracting from the appearance and value of the eggs produced.

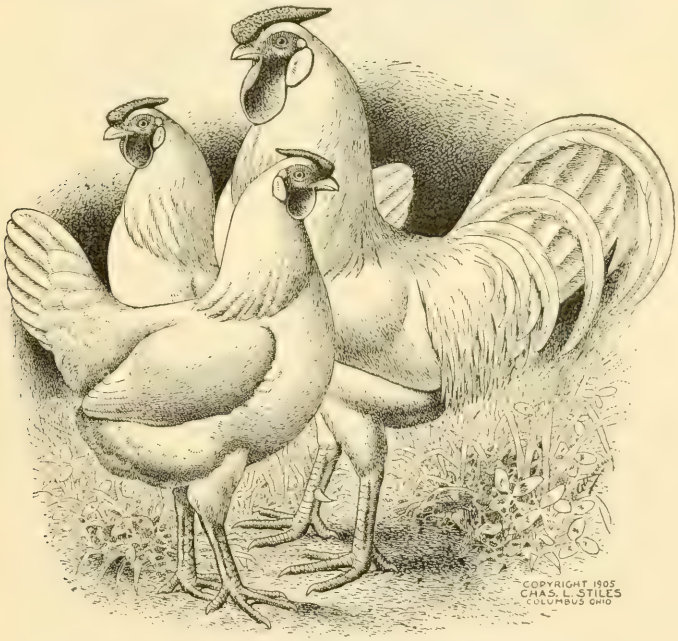
Whenever the farmer, the suburban or the city poultry-grower desires to raise poultry for the best results, he should select some one kind and stick to it in its purity, whether it be Rhode Island Reds, Plymouth Rocks or Wyandottes. If a change is made, change the entire flock for some other kind, and stick to that. Do not mix and intermingle everything you hear of into your flocks.

RHODE ISLAND RED FOWLS.

One of the varieties which stands in the front ranks of the feathered tribe is the Rhode Island Reds, which were first raised in Little Compton, R. I., by William Tripp and Isaac Wilbour, who gave them their name in 1886. Back in 1854 John McComber of Westport, and William Tripp really made the start in the breed by crossing a Chitagong cock with the Cochin China hens.

In the State of Rhode Island there is a large number of people who raise this variety exclusively, and on their large farms keep hundreds of these

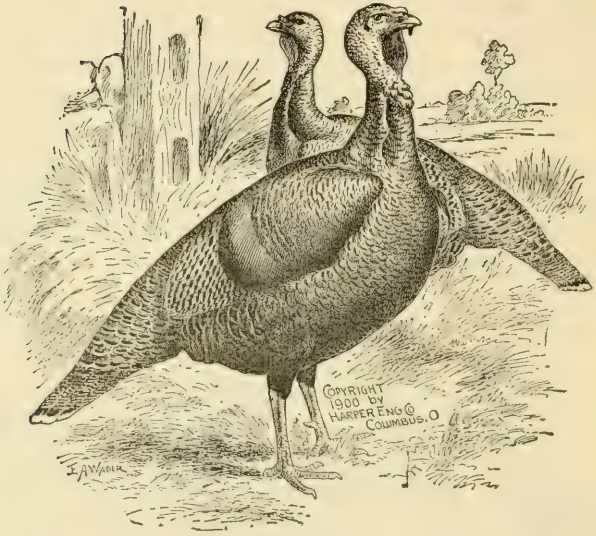
handsome red fowls. F. W. C. Almy, proprietor of the Red Feather farm at Tiverton Four Corners, R. I., is one of the leading breeders in his State of this popular variety and keeps 1800 fowls on his place which are probably second to none. During the past fall he sold 30,000 eggs for setting, which were from 80 to 87 per cent fertile. At present he is getting about 600 eggs per day. Mr. Almy has shipped the past fall over 400 birds to all parts of the country, and it is the same with this leading breeder of the Reds as with scores of others that the demand is rapidly increasing. Quite a little of Mr. Almy's stock has been shipped to this section of the State during the past few years, and they have not only proved prize winners, but splendid breeders.—Pittsfield (Mass.) Journal.



IDEAL ROSE COMB WHITE LEGHORN TRIO.

These handsome birds are of medium size, persistent as layers, being poor sitters or non-sitters, having fair fattening qualities and very good flesh. They are besides hardy, suffering from severe weather much less than the Spanish. With this breed they are evidently closely allied, all having single combs, large white ear-lobes, and in many cases partly white faces, and in the best specimens something of the style of that justly favorite breed. This variety may be highly recommended for general use, and where a superior chicken is desired.

MAMMOTH BRONZE TURKEYS.



TURKEYS.

The Bronze Turkey is the leader of all breeds of turkeys. Beautiful in plumage; it glistens in the sunlight like burnished gold. Where ample range can be had the raising of turkeys becomes very profitable and is rapidly gaining favor. They are very hardy after six or seven weeks old; the young poults must not be allowed to run out in wet weather until that age. When bred to standard their weights are: cock, 26 pounds; hen, 16 pounds. Well matured males often reach the enormous size of 40 and 45 pounds.

TURKEYS PROFITABLE.

NOT HARD TO RAISE IF THE NATURE OF THE FOWL IS STUDIED.

No branch of poultry culture is so much neglected as the raising of turkeys. I believe this is accounted for by the mistaken idea which generally prevails that turkeys are very hard to raise, and that the breeder must expect to lose at least half or three-fourths of the young birds that are hatched, says Mrs. Charles Jones in Successful Poultry Journal.

I have been raising turkeys for a good many years, and at the beginning I expected to, and did, lose a large number of birds. I began to carefully study the trouble, knowing that there could be no effect without a cause, and that turkeys, if hatched strong and healthy, should live with the same

treatment that nature had laid down for that class of fowls. In cases where this heavy loss occurs, it is nearly always the result of methods of feeding, provided the young birds are hatched in perfect health. The old method was to keep them cooped and fed upon sour milk curd as a steady diet, without grit of any kind to aid digestion. The belief was that the birds themselves could select the necessary grit. This might be all right on the old New Hampshire gritty hills, but upon our prairie soil it is another question.

Turkeys in their wild state pick up worms, grasshoppers and other animal food, and grit is absolutely necessary for them. I read everything I could find on turkey raising, and finally adopted the following methods of feeding: As the birds must have some form of meat food or its equivalent, I prepare eggs by putting them in cold water and bringing it to a boil, which is continued from half an hour to an hour. This mode of cooking makes the eggs crumbly instead of leathery, as is the case when they are put into boiling water at the start. Turkeys are disposed to liver diseases and any food that will keep the liver in good condition will keep the birds healthy. I feed them eggs chopped up, shell and all, with a little chick grit for the first two days. I then chop dandelion leaves with the egg, and add the sour milk curd with always a little grit, in the morning. At noon I feed a little curd, and at night I chop onions in the place of dandelion. In this way I succeed in raising all the chicks that I hatch without the loss of a single one.

I keep them clean and free from lice and make their food about half green food of some kind, as this helps to grow large frames. Care should be taken to not feed all that they will eat at any one time, as overfeeding will easily kill the young ones. Many breeders who have adopted this method of feeding have written me that their birds do well, and that there are no losses where overfeeding is not practiced. I feed only two eggs to about fifty young turkeys, at each feeding, although three or four might not be too many, if plenty of green food is used. I feed only three times a day and call them back to their coops each time; this prevents them from getting the habit of wandering away. I raise them in the breeding yards until they are six weeks or two months old, at which time they are no longer contented to stay there, and it is necessary to allow them range for foraging. For the first four days I always coop them in large, airy coops, in which fresh air is secured by tacking on wire netting on one side of the coop, where a large opening has been made. The coop should be moved one length each morning when the turkeys are turned out of it, as it is not advisable to allow them to roost on the same ground two nights in succession.

Nature seems to have endowed the birds with this intelligence, as it is impossible to drive a turkey into a very filthy coop if there is any way for them to evade it. If more turkeys were raised on farms of the United States there would be very little complaint of crops being destroyed by grasshoppers and all kinds of injurious insects. Turkeys are of a roving disposition and will live largely on that class of food. It is interesting to watch them when going out into the fields or returning home at night. The flock spreads out, covering a good many rods of ground, and the birds are quick to devour anything in the nature of insect life which comes in their way, and it is very little that escapes their quick observation. A farmer will find by giving the matter a little study and investigation that the turkey is the best friend he could get to prevent damage to his crop. I always drive the young birds into the coops about 4 o'clock in the afternoon, until such time as they have learned to come in for their last meal of their own accord. After they have been taught this, they can be left out a longer time, and may be depended upon to return at somewhere near the regular meal time. They can also be taught to return at the call of the attendant. Low roosts are arranged in the breeding yard, and when the birds have been taught to come home to roost themselves, they are practically raised. We do not feed them anything after this time until the ground freezes hard so they can no longer get their living by securing it from the fields. During the first six weeks they should be gone over once a week and dusted with some good lice powder, not neglecting the larger quill feathers on the wing, which is one of the favorite hiding places for these pests. The heads of the birds should also be greased lightly with some sort of ointment that will kill the lice. I seldom lose a bird except by accident.

RAISING YOUNG TURKEYS.

In almost everything that is written for the poultry journals in regard to the hatching and rearing of young turkeys, one will find the advice: "Always let the turkey hen hatch and take care of the young poults." I cannot agree with this advice, and think this one of the greatest causes of failure to raise the young poults to maturity. My experience has been that when hatched and mothered by chicken hens, I can raise almost all and often every one of a hatch, while if the turkey hen is allowed to wander away with them I consider her lucky if she raises one-third of all she hatches.

The principal cause of this is the young turkey cannot stand to be led around through the wet grass before the dew is off, and that's the way the mother turkey always does. So my advice is: Select a quiet old hen to set on your turkey eggs. When the little turkeys are thirty-six hours old, or over, remove from the nest, dust the hen thoroughly with insect powder and put in a dry, sunny place, facing the east. Shut the hen in a coop and have a small yard for the babies to exercise in.

The first feed, which should never be given until they are thirty-six hours old, should consist of hard boiled eggs, four times daily, just what they will eat clean and no more. Keep clean water, ground oyster shells and plenty of green grass before them at all times. After they are four days old change the eggs to curds and stale bread soaked in sweet milk.

Here is another important item: You will need plenty of sour milk on hand to make the curds, as the growing turkeys have a simply wonderful appetite, and I have found they prefer this food to all others, and that they thrive on it better than on any other food I have yet tried. In fact they will not eat grain as long as they can get the curds.

As they become older, gradually change their feed to wheat, oats and whole corn. Oats make a splendid food for growing turkeys, as they contain a large proportion of phosphorous, which makes them large, strong-boned and vigorous. After they are six weeks old they will begin to wander over the fields and woods in search of food, but should be fed grain every night when they come home, as this keeps them from wandering off to the neighbors.

TURKEYS.

If very often occurs that two or more hens will lay in the same nest, a proceeding which will prove very annoying and try your patience if you are expecting to set one of the hens. If you should not be in a position to conveniently yard your laying turkeys, there will be danger of your driving some of the layers off to parts unknown in trying to break them from the habit of laying in this particular nest. To relieve the danger of driving the hens off to parts unknown, for suitable nesting places, a nest may be made near the one generally used, furnished with nest eggs, and the hens are very likely to take to them, avoiding a change of nests. A turkey hen, we find, will sit much better on the nest where she has laid her clutch of eggs, consequently we use every precaution not to get the hen disturbed previous to incubation. It is best, however, not to disturb the hen after incubation has begun. If for any reason you find it neces-

ary to visit the sitting turkey hen (or nest, rather), always make your visit at a time when the hen is absent. Otherwise you are liable to destroy the entire clutch of eggs, especially if your hen is of a "highstrung," timid nature. May is the month that should find the majority of the turkey eggs incubated, and the poults well started out on the season's campaign, battling for existence with lice, rats, crows, hawks, old sows and the good Lord knows what all.

When we think of the many obstacles in the way of the young turkey poults they are compelled to contend with before they ever reach maturity it seems as if it is almost a miracle performed in maturing a turkey. Yet turkeys as a rule are naturally more easily raised than most any other domestic fowl, but where the trouble coms in, they seem to have so many more enemies, and there is the danger of over-feeding.

TURKEYS AND THEIR NESTS.

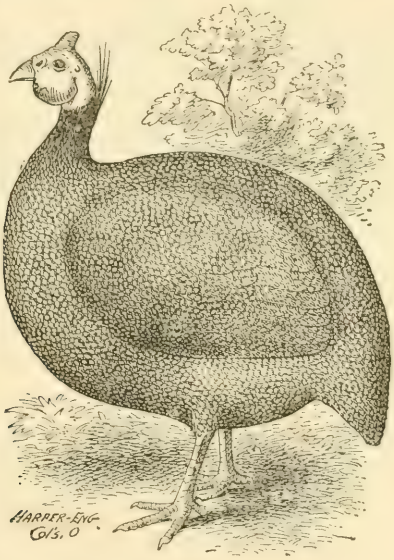
Turkeys like to hide their nests in the bushes or hedgerow. I have found it a good plan to fix nests for them early in the season, quite a little while before they begin laying, so they will have time to get used to them, says a writer in Farm and Home. A good way to make a turkey's nest is to use a barrel. Take a board six or eight inches wide and two and a half feet long. Lay on its side on a level spot of ground, and place the board at the bottom side of the front, letting it extend equal lengths on each side of the barrel and nail fast with long, slim nails. This forms a rest that will make the barrel stand firm and not shake or roll around when the bird is inside.

An open box about two feet square with one side knocked off makes a good nest for a turkey. Hide in the hedgerow or among the bushes near the house and put some nice clean straw in it. The turkeys will soon find it and choose it for a nest.

It is always best to set turkeys on the ground. The eggs hatch better and the birds are stronger. These covered nests are quite a protection, especially from robber crows, who dearly love eggs.

Sometimes a laying hen will adopt this nest and the turkey seeing her there will lay in the same nest. When this occurs it is a good plan to let them lay their litter out together, removing all the eggs except the nest egg each day. When they begin to sit shut up the hen and let the turkey hatch her own eggs, or break up the turkey and let her lay another setting of eggs and let the chicken-hen do the hatching. The turkey-hen will begin laying again in ten or twelve days.

I find it a good plan to set a chicken-hen and a turkey-hen at the same time and give all the young birds to the turkey-hen after they are hatched. The first food given them had better be hard boiled eggs chopped fine, soaked bread crumbs and well cooked cheese curds sprinkled with a little black pepper. Mix with their food occasionally some finely chopped onion tops, of which they are very fond and seem to thrive on. Let the turkey hen run on the grass as soon as the little birds are strong enough to follow her to catch bugs and grasshoppers, which are their best food.



GUINEA FOWL.

Among all domestic birds the Guinea fowls are the most shy and peculiar breeds, half wild, ever active, upon the approach of a stranger or any danger with a shrill cry they will sound the warning note, and even this characteristic is often useful on the farm against hawks and other varmints preying upon the poultry yard. The eggs of the Guineas are smaller and darker than hen eggs and are not a very desirable market variety. On account of the dark meat and gamy flavor the Guinea fowls are becoming quite popular, and are gaining in favor every season for shipment to large markets in the North. The usual marketing age of Guineas is from 5 to 8 months old. Where a pair formerly sold in large markets for from 50 to 75c per pair they now bring from $1 to $1.50 per pair. Guineas may be profitably reared on Southern farms, orchards and gardens, as they are a great help to keep down the insect pest.

With respect to Guinea fowl, the analyses show that the flesh is more like ducks and geese, which are on an average richer in fat. Judged by chemical composition, the Guinea fowl, like other poultry, is a valuable and nutritious article of diet, and is commonly conceded to be very palatable, resembling game quite closely.

On the basis of experience a Southern poultry raiser considers that it is best to raise Guinea chicks with a common hen or turkey as a mother, particularly since they can be kept out of wet grass and weeds in the early morning more readily than when hatched by Guinea hens. In the experience of this writer attacks of mites and lice more often end fatally with Guinea fowls than with other poultry, and whitewashing the trunks and branches of the trees where they roost is recommended. This writer also believes that after laying, sitting, and molting the Guinea hens should be caught and dipped in water and grease to free them from vermin.

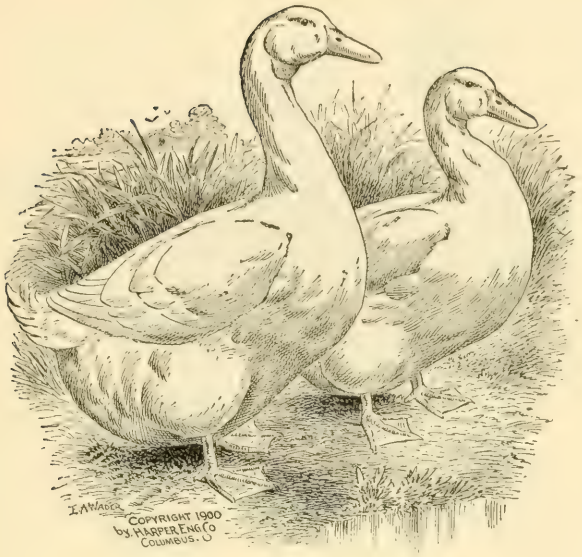
Another poultry raiser on the basis of personal experience recommends for newly hatched Guineas a coop 8 or ten feet long, 5 feet wide, and about 2 feet high, covered on the sides with 1-inch mesh wire netting and on the top with 2-inch mesh netting. This coop, which can be easily moved from place to place, has a door in one end, and in bad weather can be covered on top with boards. If fed in the coop and fastened in so that they will roost there, the chicks will readily learn to return to the coop at night.

In buying some new poultry fall stock don't overlook the fact that Guinea fowls are both profitable and useful. For table use they have few superiors and their flesh has almost the same flavor as the prairie chicken.

MILK CHICKENS.

The raising of little chicks, or "milk chickens," is a branch of the poultry business which yields a quick profit, but it has not been exploited to any great extent in this country. These dainty little birds are great favorites in Belgium and in France. Most of those which appear on the tables in those countries are originated from "milk chicks." There is an increasing demand for "milk chickens" at the health resorts and at the wealthier towns which might all be met by local poultry keepers.

The chickens used for this purpose should be hatched in March or April, as the trade does not extend beyond the last of August. Nothing but soft food should be given the birds, such as ground oats, or better still, oatmeal with a little salt added during the last two weeks of feeding. Sand, or a little fine grit, should be supplied.

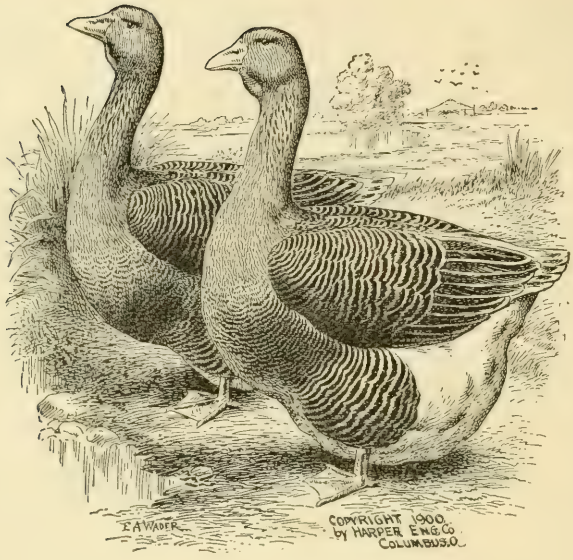


DUCKS.

Ducks are useful and profitable farm birds, especially where a pond or water is accessible to these water fowls. While the eggs of the ducks are slow sale they are very nutritious and are preferrrd by many even to chicken eggs. The main profit from ducks is derived as a meat bird for fall and winter trade. The Pekin Duck is a large and more showy duck than the common duck, and the meat of the Pekin Duck, on account of its gamy flavor is in better demand than the common duck.

As the true Pekin Duck is a non-sitter, incubation must be done by a chicken hen. Have the nest on, or as near the ground as possible; if in a fence corner, or in the weeds so much the better, though be careful of stray dogs. After the first week, watch the hen closely, and every time she comes off the nest to feed, sprinkle the eggs with luke warm water; don't be afraid to wet them.

On the morning of the twenty-eighth day remove all the ducklings as soon as hatched, and assist any that are having difficulty in making their appearance. When all hatchables are hatched, take all the ducklings and keep in a basket, or box, for a few days. Shut the hen up to break her of her broody spell, for if you want to raise your ducks don't allow the hen to carry them. She will run and tramp them to death scratching. Who ever saw a duck scratch in straw or dirt?



TOULOUSE GEESE.

The Toulouse Geese are purely French bred. Both male and female are very massive in proportion. The bill and feet are dark orange color; head, neck and back a dark gray, breast light gray, but descending lighter till beyond the legs to the tail they are pure white. The combination of colors presents a very attractive appearance.

Both male and female are uniform in color, being alike to a feather. They live to a great old age; some having reported them living and doing well at the age of thirty years. Goose raising is very profitable, as they need no grain in the summer, when they can have plenty of grass to feed on, and are small feeders in winter. Now while the expense is so light to keep them, and you can on the other hand pick their feathers four times in one season, making two pounds of feathers from one goose, which are worth from $1 to $1.50, besides the young you can raise, the profit is large. The weight of an adult goose is 23 pounds, gander 25 pounds.

NEXT WINTER'S LAYERS.

Pullets cannot stand any set backs, and must be kept growing from the day they are hatched until they are placed in the laying quarters. There is no secret about the matter. At no time in their lives must they be overcrowded. Plenty of room, so that they can have plenty of exercise, is not only desirable, but imperative.

Pullets for profit should be kept tame. Wild, scary birds never amount to much; the egg crop depends upon the amount of confidence and comfort the hens, old or young, possess. Each must be active and be made to take all the exercise possible. This advice has been given time and again, and quite frequently neglected. The best exercise is a search for food.

For future layers select only the best devloped birds and discard the runts. We do not believe in an egg type, but do pin our faith to size, vigor and health. Pullets when selected for future work should be yarded alone. The best success is attained when no more than four or five brooders are placed in one house. Where there is too great a number the result will be the same as when there are too many old birds kept in one house. They will cause the air to be too foul and disease will be the result. Usually about thirty to fifty chicks are placed in each brooder, and when more than five brooders are in one house it can be seen that it will not take long for the air to become too impure for the chicks.

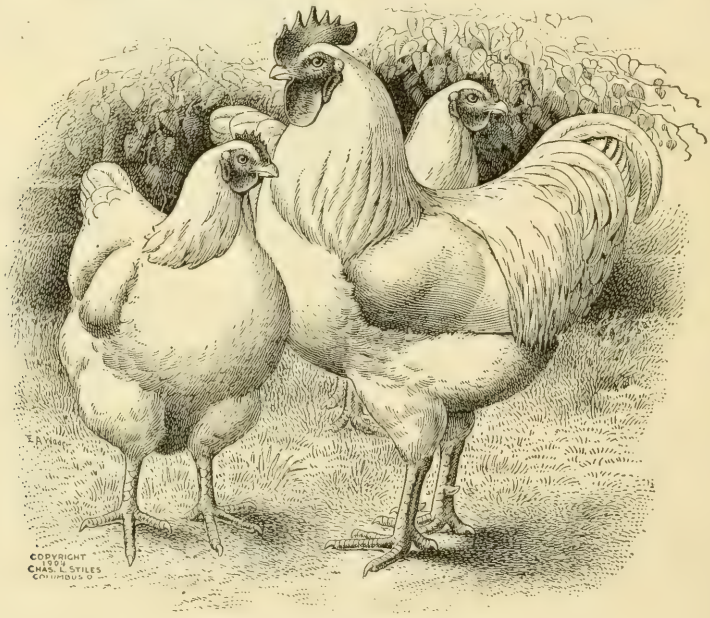
The house should be built with the windows to the south, as sunlight can be easily admitted. The windows should be large, as the larger they are the more sunlight will be admitted and the warmer the room will be during cold weather. It is not necessary to provide any other heat except that furnished by the lamp in each brooder.

PRESERVING EGGS.

I read an article in "The Kansas Farmer" some time ago in regard to preserving eggs in water-glass. As I have forgotten the recipe will you please state how much to use in 3, 5 or 10 gallons of water? About what does it cost per gallon, and is it against the pure food law? Can I use a barrel or galvanized tub to pack the eggs in, or does it require stone jars? Please state all you can so I may pack a few and see how they will do. What is a good remedy for chicken roup?—W. O. Phillips, Rooks County.

Answer.—Water-glass is silicate of soda, and comes in dry or liquid form. It is better to buy it in the liquid state. It can be bought at from 60 to 80 cents per gallon, depending on the drug store you buy it from, and also on the quantity you purchase. The directions for use are: Use pure water that has been thoroughly boiled and cooled. To each quart of water-glass use ten quarts of water, or if in gallons, ten gallons of water to one gallon of water-glass. Pack the eggs in a jar and pour the solution over them. The solution may be prepared, placed in the jar and

fresh eggs added from time to time until the jar is filled, but care must be taken that all the eggs should be covered with the solution at all times. Keep the jars in a cool place, with covers over them, to prevent evaporation. A cool cellar is a good place in which to keep the eggs. If the eggs are kept in too warm a place, the silicate will be deposited at the bottom of the jars, and the eggs will not be properly protected. Do not wash the eggs before packing, for by so doing you will injure their keeping qualities. For packing, use only perfectly fresh eggs, for eggs that have already become stale cannot be preserved by this or any other method, and one



WHITE PLYMOUTH ROCK TRIO.

stale egg will spoil the whole batch. Barrels or galvanized tubs can be used, provided they are perfectly clean, for any odor that may be in a barrel is liable to be communicated to the eggs. We do not believe there would be any conflict with the pure food laws, for the solution does not amalgamate with egg, but simply acts as a preservative, the same as a sealed can does to preserve fruit.

One of the best remedies for roup is Conkey's Roup Cure.

STARTING AN INCUBATOR.

It is a great saving of time and oil in the start if the water for the tank is first heated to the boiling point before being put into the incubator. Fully ten or sometimes twenty-four hours may thus be saved, since water heats much more slowly in the machine than in the tea kettle.

THE DUST BATH.

The dust bath is one of the essentials to maintain a poultry flock. In hot weather, unless the weather is wet, the dusting place should be out of doors under a tree, if convenient. Dig the soil deep and mellow, and work it over frequently. A little sifted wood ashes may be added with benefit This will save you much trouble with the lice and mites, although I should not depend upon it entirely, for in very hot weather the mites will hatch and increase faster than the hen can rid herself of them.

GREEN STUFF FOR CHICKS.

The Washington correspondent, Guy E. Mitchell, is responsible for the following:

"An excellent green food for young chicks can easily be provided through the expenditure of a few cents for oats. A half bushel of oats should be placed in a shallow box so that the entire mass is two to four inches deep. This should be sprinkled with water daily until the seeds have become saturated, when they will sprout and continue to send up tender green shoots. Very young stock may be fed the shoots only, when older chicks can be given seed and all."

Our chicks are out on free range, and they find young clover leaves, the blades of tender grasses, chick weed and many other succulent and palatable weeds, and from now on until fall, we will have no trouble in providing green stuff. Sometimes we have to keep the old fowls in a yard. In that case, or where such a course is usually necessary, lawn clippings, weeds from the garden, beet tops, the old lettuce plants and waste, overgrown cabbage plants, and many similar things can be utilized to give to both old and young fowls the succulent green stuff needed. At the Cornell station grounds at Ithaca, we found rape as one of the crops grown and used with much success for feeding to chickens in confinement. An immense amount of such stuff can be grown on a little patch in the garden, or out of the way corner.

Many farmers neglect their opportunities. They ought to know that hens will pay as well as their cows, sheep and hogs. Eggs are always salable at a profit in summer as well as in winter. If prices should go down too low, he can preserve them for higher prices. In eggs alone he can be assured of a very fair income.

Milk fed to hens will be found to be more profitable than if fed to hogs. It is admirably adapted to egg-production as well as for growing chicks. It may be placed in the drinking vessels, or scalded to mix the soft food with. Sour milk, skim milk, clabber, all are good and greatly relished by the fowls. It takes the part to a great extent of animal food and meat, and the latter may be dear and hard to get, whereas skim milk may be plentiful. Feed it, therefore, to all kinds of chickens, young and old.

An experienced turkey raiser says that young turkeys should not be fed any corn, cracked or whole, till after they have "sported the red." When turkeys get to be about three months old the down on their heads and necks is replaced by corrugations of flesh (comb and wattles); these as they become older become red, and it is called "sporting the red." After this time turkeys become very hardy, and are rarely troubled thereafter with any disease.

There is a handsome profit in growing broilers and capons, but considerable experience is required in both branches before the balance is on the right side of the ledger. The chief danger lies in the fact that inexperienced people will make a specialty of either to the exclusion of the regular breadwinning poultry culture. In caponizing it takes an expert, and then there must be a special demand or market for them or prices commensurate with their cost cannot be secured.

TO INCREASE EGG LAYING.

A significant statement in Secretary Wilson's report shows that investigations are now being made by the department of agriculture in conjunction with the Maine experiment station with a view of developing a strain of chickens with increased egg-laying capacity. Several hens have been found to lay more than two hundred eggs in one year, and the results seem to indicate that by selecting and properly feeding the best layers for breeding purposes the average egg yield of a flock can be increased.

Poultry, says the secretary, is one of the steady and helpful sources of farm income. Movements are already on foot which may be expected to increase the egg production per hen by at least a dozen a year within a generation, and there are poultrymen who are not enthusiasts who foretell double that increase. If the hens of this year had each laid a dozen eggs more than they did the prediction is made by Secretary Wilson that the increased value of this product would have been possibly $50,000,000.

With eggs as low as a cent apiece—a very cheap and nutritious food—a well-bred hen laying two hundred eggs a year, as developed at the Maine station, will have a value of $2. An estimate is made that $1 a year will keep her in comfortable if not luxurious quarters. The trouble is that millions of barnyard scrubs do not yield a hundred eggs a year. If one wants to obtain eggs from his hens it is necessary to have healthy, vigorous stock properly fed. To do their best, hens should be fed grain, animal and green food. They should be fed enough to keep them in good condition, but not overfat, and should be induced to take plenty of exercise.

A good system to follow for winter feeding is mash once a day and grain scattered in the litter twice a day. The mash may be fed dry or slightly moistened. When the former, it is usually put into a trough or hopper hung against the wall, and the fowls allowed to have access to it at all times. A mash at the Maine station is as follows: Two hundred pounds wheat bran, one hundred pounds each of cornmeal, wheat middlings, linseedmeal, gluten-meal, and beef scraps. Another mash may be mixed as follows: One hundred pounds each of cornmeal, ground oats, and wheat bran.

HOW TO DRESS AND SHIP POULTRY.

In the first place, poultry should be well fed and well watered and then kept from 18 to 24 hours without food before killing. Stock dresses out brighter when well watered and adds to the appearance. Full crops injure the appearance and are liable to sour, and when this does occur correspondingly lower prices must be accepted than obtainable for choice stock. Never kill poultry by wringing neck.

TO DRESSS CHICKENS.

Kill by bleeding in mouth or opening the veins of the neck; hang by the feet until properly bled. Leave head and feet on and do not remove intestines nor crop. Scalded chickens sell best. For scalding chickens the water should be as near the boiling point as possible without boiling—160

to 175 degrees Farhenheit. Pick the legs before scalding; hold by the head and legs and immerse and lift up and down five or six times; if the head is immersed it turns the color of the comb and gives the eyes a shrunken appearance, which leads buyers to think that the fowl has been sick; the feathers and pin feathers should then be removed immediately, while the body is warm, very cleanly and without breaking the skin; then "plump" by dipping ten seconds in water nearly quite boiling hot, and then immediately ino cold water; hang in a cool place (or better, place on shelves in the shape you wish them to appear when cooled—hanging draws the breast muscles and makes them look thinner when cool and harder to pack) until the animal heat is entirely out of the body. To dry pick chickens properly, the work should be done while the chickens are bleeding; do not wait and let the bodies get cold. Dry picking is much more easily done while the bodies are warm. Be careful and do not break and tear the skin.

TO DRESS TURKEYS.

Observe the same instructions as given for preparing chickens, but always dry pick. Pick when warm to avoid tearing. The tail feathers come off with a twist—a straight pull will "set" them. Dressed turkeys, when dry picked, always sell best and command better prices than scalded lots, as the appearance is brighter and more attractive. Endeavor to market all old and heavy gobblers before January 1, as after the holidays the demand is for small fat hen turkeys only, old Toms being sold at a discount to canners.

DUCKS AND GEESE.

They should be scalded in the same temperature of water as for other kinds of poultry, but it requires more time for the water to penetrate and loosen the feathers. Some parties advise after scalding, to wrap them in a blanket for the purpose of steaming, but they must not be left in this condition long enough to cook the flesh. Do not undertake to dry pick ducks and geese just after killing for the purpose of saving the feathers, as it causes the skin to become very much inflamed, and is a great injury to the sale. Do not pick the feathers off the head. Leave the feathers on for two or three inches on the neck. Do not singe the bodies for the purpose of removing any down or hair, as the heat from the flame will give them an oily and unsightly appearance. After they are picked clean they should be held in scalding water about ten seconds for the purpose of plumping, and then rinsed off in clean cold water. Fat heavy stock is always preferred.

Before packing and shipping, poultry should be thoroughly dry and cold, but not frozen; the animal heat should be entirely out of the body; pack

in boxes or barrels, and see that packages are clean, lining them with manila or straw paper; boxes holding 100 to 200 pounds are preferable, and pack snugly; straighten out the body and legs so that they will not arrive very much bent and twisted out of shape; fill the packages as full as possible to prevent moving about on the way; barrels answer better for chickens and ducks than for turkeys or geese; when convenient, avoid putting more than one kind in a package; mark kind and weight of each description on the package and mark shipping directions plainly on the cover.

HOW TO DRESS CAPONS.

First be sure and not kill them until crops are empty and they are fat. A thin capon is not as good as an ordinary chicken, because if not large or a proper capon, they are not wanted as capons or chickens either. Leave feathers on neck from head down two-thirds way to shoulders. Leave feathers on tail and half way up the back. Leave feathers on legs from knee joint two-thirds up the hips. All the rest of the feathers come off. Feathers that are removed should be saved and will sell if kept dry and clean. Be careful and keep the capon clean. Wrap paper around head. Appearances add to the sale and, of course, price.

KEEP THE CHICKS GROWING.

Overfeeding is a common cause of a check of growth, but is a serious waste of foods which costs money. It may seem odd to some that growing chicks can possibly be overfed, but they are much more frequently than we think. A successful chicken raiser in New Jersey told me that his greatest trouble was to guard against overfeeding; that a chick that ate too much was dumpish for a day or two and the growth stopped for that time. His rule was to shut off the food from a pen where any food was left uneaten ten minutes after they had been fed, and let them rest up a bit. The only safe rule for feeding is to feed a little at a time and feed often, and the real difficulty is to feed the little. In our desire to have the youngsters make a good growth we are apt to put down just a little more, and then we have done mischief by overfeeding! If we could only realize that overfeeding is really a cruelty to the chicks as well as a waste of food, we would be more considerate. The advice of an old and most successful chicken and duck grower is to keep them just a little hungry, which is but another form of the rule given by Franklin for humans to follow, namely, "Rise from the table with still a little appetite remaining." That is common sense for both human and chickens, and if

we would apply it to feeding the youngsters, not only would they make a better growth, but would come to maturity in sounder physical condition, with stronger constitutions.

Lice most certainly cause much loss of growth in the chicks, and decidedly lower the constitutional vigor. One argument in favor of hatching the chicks in brooders is that they are then free from lice, so long as they are kept away from contact with lousy hens. Chickens hatched by hens may be practically free from lice if the mother hen is well dusted with a good insect powder three times, about a week apart, during the three weeks of sitting. This dusting, if thoroughly done, will kill all the lice then alive on the hen, but cannot reach the "nits" (eggs), which are to be seen clustered around the shafts of the feathers, close to the hen's body. Shortly these nits hatch out another flock of lice, which begin to reproduce their kind in a few days, and the hen becomes populous again; hence the advice to dust the hen three times, about a week apart, and thus catch the newly hatched lice before they have reached maturity and laid more nits. We want to emphasize the idea of a "good" insect powder because, unfortunately, some of the insect powders on the market are very much adulterated and are less effective than they should be.

Eternal vigilance is the price we must pay for the success with poultry, and it is the best success that gives both personal satisfaction and the best profits. That, after all, is the last analysis of all our effort—the cash profit that results. Every observing poultry grower knows that the strong constitutioned and splendidly vigorous birds are the ones that pay us best, and those are the birds that are well hatched and well grown, that have suffered no check to growth from the time they left the shells till they have reached maturity.

FEEDING LITTLE CHICKS.

Some months ago I was requested by the editor of the Inland to give my method of feeding chicks. This could be done in a very few words, but it is a different undertaking to outline all those conditions necessary to success in the rearing of chicks. This is more especially true where chicks are to be raised in any considerable numbers. And so much has been written on this subject that it places an inexperienced writer in a position that may subject him to much undesirable criticism. Many years of actual experience has convinced me that the following conditions, when closely adhered to, will produce satisfactory results, and may be adopted by the farm poultrymen. We must first look to the fowls that are to produce the eggs

that we are to place in the incubators. All females should be carefully selected, excluding from the breeding pens all that are not in a strong, healthy condition. The same care must be given to the selection of male birds. Double mating is regarded with favor. Fowls that have been closely confined for several weeks seldom produce strongly fertilized eggs. Much better hatches can be secured if the incubators are not filled until the hens have been allowed outdoor range for a few days and the chicks will be much stronger and better able to make a good start.

With eggs from healthy stock we are now ready to turn our attention to the incubating of our eggs. Here I have to consider what I say will be read by those operating the hot water, hot air, the non-moisture, the delusive and all other kinds of incubators, most of which will be found more or less satisfactory or otherwise according to the care and attention of fowls, eggs and incubator. Cleanliness in the incubator and the incubator room is very important. Have incubator regulated at one hundred before eggs are placed in the incubator, and do not allow them to go above 103 for the first week. Do not attempt to hatch light and dark shell eggs in an incubator at the same time. Under such circumstances good results are seldom attained. Test the eggs frequently, removing from the incubator all that are not strong and healthy. Turn the eggs in the morning, fill lamps at noontime, turn and cool the eggs to 80 or 85 degrees at evening. Under ordinary weather conditions we are earnest advocates of some moisture after the twelfth day and always at time of hatching. Doors to egg chamber of incubator must be kept closed from and after the eggs commence to pip. Stop all possible escape of warm, moist air from the incubator at any point above the egg trays, and if your incubators have no openings for air from the bottom, make some and leave them open at all times, as oxygen is as necessary at time of hatching as after the chickens are in the brooder; the lack of oxygen always produces a puny chick that will never make satisfactory growth. We now take the chicks from the incubator, having provided proper brooders for their accommodation without crowding, dividing them into broods of not more than fifty for each brooder. We give them a small amount of fine pearl chick grit. After this a moderate feed of hard boiled egg and bread crumbs. At the same time we place in each brooder two or more small wall trays where the chickens can reach them and we keep the following mixture constantly before them for the next two months: Two pounds wheat bran, two pounds fine cracked corn, one pound of oat flake, one pound granulated bone, one pound beef scraps and one-half pound fine pear chick grit. This should be well mixed, and a fresh supply placed in the brooder every night. I do not know that

this is a balanced ration, but I positively know that chicks made to depend largely upon this diet thrive and are almost immune from bowel trouble. They are allowed to eat of this freely in the morning and are then given a little feed of cracked grains or any of the good chick feeds. When ten days old we commence to feed a mash of equal parts of wheat bran and chop, made by grinding equal parts of corn and oats together and a small amount of meat meal and bone; mix and pour scalding water on sufficient to wet it up, but do not make it mushy, letting it stand until it cools down until right to feed; never give them all that they will eat of this. Leave them a little hungry. At night all the dry chick food that they will eat up. This, with plenty of pure water at all times, with good sanitary conditions and the usual amount of green or vegetable food, should produce satisfactory results. Small colony brooder houses are a great help at all seasons of the year, and are almost a necessity. Remove the chicks from the brooders just as soon as it is possible, placing them in the houses that have been cleaned and made ready for them; they will do better here than they will in the brooders after the time that artificial heat is no longer needed. At this time commence to cull out the undesirable cockerels and place them in a pen where they may be forced and got into condition for market as soon as possible. And the other cockerels should be placed by themselves and given as much range as possible that they may make healthy growth. It is not best to keep the large and small breeds together, as the small and more active birds rob the larger ones.

NATURAL BROODING.

It is wonderful how well the mother hen will look after her brood when the weather gets warm and she is given a reasonable chance to do so. Keep the hen and brood free from lice and with a good roosting coop to protect her at night, she may be allowed to roam at will with the chances in her favor that she will succeed in raising a goodly number of fine healthy chickens.

Nature's way is hard to beat when conditions are right. Many a brood of chicks has been ruined by too much pampering and confinement. Be good to your little chick, but not too good.

PLUM TREES IN POULTRY YARD.

Plant plum trees in the yards where hens are confined. The hens soon learn to pick up the curculio which drop from the trees, but they can

be easily led to do so more freely by scattering grain under the trees and shaking them while the hens are present. Poultry enjoy eating curculio or bugs, beetles, etc., more than they enjoy eating grain or most other forms of food. They will begin to pick up the curculio when it drops at their feet. It is well to enlarge the poultry yard opening off from the poultry house, so that it occupies considerable ground, perhaps one-fourth or one-half an acre. The hens keep this ground cultivated and free from every weed or spear of grass, keep the ground fertilized, and this induces vigorous growth of trees without much, if any, cultivation by the owner. All kinds of fruit trees do well in hen yards, and grow more vigorously there than in other localities.

One gives his experience as follows: In planting a little scrub Burbank plum tree that was thrown away by a nurseryman in one corner of his hennery. At the same time he planted large and beautiful plum trees in other parts of his grounds; but the little scrub tree in the hennery had made five times the growth that the larger trees did in very fertile ground. He placed a little pack of stones about the base of the plum tree to prevent the hens from uncovering the roots by wallowing in the soil, as they often will. The pile of stones undoubtedly kept the ground moist and aided the growth of the tree, but the fertility of the hennery yard and the continuous scratching of the hens keep the soil cultivated and the gress and weeds had no opportunity to grow. The little tree had nothing to do but to grow. —Garden and Farm.

CHEAP EGGS FOR HATCHING.

During the summer months some of our leading and most prominent breeders of thoroughbred poultry will sell you eggs for hatching from their finest stock at reduced prices. This is true for the reason that they have hatched all they care to for their own use and the rush of the shipping season is over, consequently with a good supply of eggs coming in each day they can afford (they think) to reduce the price to induce buying. Farmers, amateurs and those who do not feel like paying $2.00, $3.00 or $5.00 for a setting of the finest eggs early in the season, may be able with care and close attention to hatch and raise some fine stock during the hot summer months. It is worth the trial anyway.

Along the same line of procedure we may note that poultrymen frequently sell some of their breeding hens at greatly reduced prices rather than keep them over when they have so many youngsters on the way. You can

make a good investment in that way and be able to raise a goodly number of chickens through the summer and fall, enough to pay for your purchase many times over.

A good food for growing chicks or laying hens is fish waste, if used fresh, or young and inferior refuse fish which can be had at canning and packing plants, usually free of cost. This food is rich in protein, and is a remarkable egg and flesh producer. A proper way of preparing this waste or refuse is to steam or bake it quite thoroughly, thus eliminating any offensive odor, and mix it with the daily mash of corn or oatmeal or middlings. It will take the place of a meat diet, but should not be fed too freely or too often, as it may have a tendency to lessen the amount of exercise the fowls should take. When the fish are properly cooked the flavor will not be perceptible in the eggs.—Florida Poultry and Agricultural Journal.

MEAT FOR FOWLS.

Quick-growing birds require considerable bone and muscle-forming material. Our little chicks have again given us an impressive lesson in this respect. We had a flock of incubator-hatched Hamburgs in the greenhouse. They had their frequent rations of shredded wheat mixed with a fair proportion of beef meal, grit, granulated bone, etc., and just moistened with milk, or, in the absence of milk, with boiling water. We thought we gave all the protein that was required or safe. But when the chicks got to be a few weeks old and they were admitted to another part of the greenhouse, where we had a quantity of rich soil on the floor, they were so anxious for the earth worms that were exposed when soil was shoveled up for use in flats or pots, or turned over, or such worms as they could find by scratching in this soil, that we had to be very careful with the shovel so as not to hurt any of them in their eager search for the worms around the shovel. Then let one of the chicks get hold of a big worm, and it would run away with it from the others, possibly half a dozen or a dozen other chicks running after it to get a peck at the worm. One of the boys finally dug up a lot of worms in a rich garden spot and gave them to the chicks, repeating this for some days, until the chicks had become filled up with worms. Great quantities of earth worms, and some of them quite large, had been swallowed by the little things, and at least their eagerness for this diet began to abate. They still eat worms, but not with the same

avidity as at first. A reader in South Carolina asks us how much green bone should be given to one fowl for best results. He says he has a Mann bone cutter, and can get plenty of bones from market. Sometimes his hens do not seem to do well after feeding bones, and their droppings are soft and white, and some hens lay soft-shelled eggs at night. They had plenty of run on rye and clover. We are not much afraid of giving too much green cut bone and meat to our fowls or chicks. To feed an ounce a day to a grown hen is not an excessive quantity, provided, however, that the meat and bones are perfectly sweet. Half decayed fleshy matter should not be fed. We would not want to eat eggs from hens thus fed, and the practice is dangerous. Fowls are often killed by the poison in decaying meat. Feeding excessive quantities of meat may, of course, bring on diarrhœa or other troubles of this kind. Soft-shelled eggs may be due to the lack of shell-forming material, or to an inflammation or unhealthy condition of the walls of the oviduct which secrete the calcareous matter.

CULL THEM OUT.

The summer is the season of the year to get rid of your old hens. By this I do not mean all your hens, but the old ones—those that are three years old or over. As a rule they will not pay after they have attained that age, and this is the best time in the year to market them. They are in prime condition now, and the moulting season will soon be upon them, when they will stop laying and be an expense to you without any returns.

Many of these 3-year-old hens will go for months during moult without producing an egg. This is a losing proposition. Those who use the trap nests often find an old hen that is almost worth her weight in gold in the laying business. Such should be kept as long as profitable, which may be five years. However, when you have no means of telling, better do the culling.

To offset this culling process, look well to the pullets you are raising and do not let one of them go to the block. You will need them to fill the vacancies made. Many of our farmer friends are thoughtless about this very matter and let many a nice pullet go to market for the sake of the thirty cents in sight, rather than keep her for the dollars that she would produce, but which have not appeared upon their horizon. A bird in the hand is not always better than the two in the bush, if we are reasonably sure of what we can make out of the two in the bush. "Prove all things. Hold fast to that which is good," may well be applied anywhere along the line.

RATION FOR A LAYING HEN.

A question which has been frequently asked in the institutes I have attended is, What is a good ration for a laying hen?

That question answers itself, if you give it a thought. We will ask ourselves this question: What is an egg composed of? Seventy-four per cent of the egg is water. Now, how necessary is it that a hen should have water every hour of the day—nice, clean water. Because it is impossible for a hen to lay many eggs without water.

When a housewife opens an egg in a saucer and examines it, and the egg is not so nice as she would like to see it, the white of the egg is watery and the yolk is pale, she thinks that the hen is sick, but that is not so.

When the white of an egg is watery, it shows that we are not feeding a good, well-balanced ration. The lack of protein in feeding causes it. Fourteen and a half per cent of the egg is protein. That is the white of the egg.

We must find a ration rich in proteim. That we can do by feeding plenty of clover and wheat bran and wheat middlings. What is the result? The white of the egg is thick and attractive.

Ten and a half per cent of the egg is fat; that is the yellow. If the yellow is pale we can color it by feeding.

If you feed too much buckwheat the yellow of the egg will be pale. We feed yellow corn and wheat, two glutens, and in that way give a beautful hue to the yellow. We also feed quite a good deal of corn, to produce fat.

How often do you pick up an egg that won't stand shipping? Sometimes you find an egg with nothing but tissue—no shell at all. What is the matter with that hen?

The shell is composed of lime and it is a great drain upon the hen's system, to produce the shell. They must have lime enough to cover the egg with a shell.

Clover is rich in protein and is rich in lime, but, in addition to this, we slack a little lime and put it into the shell box, and the hens will go there if they require it; and you will be surprised, if you try it, at the difference in the results.

What is the result of this kind of food? We will break an egg in a saucer and see. The white of the egg is thick and heavy; it is attractive, nutritious; the yellow of the egg is the golden hue that was desired and the shell is firm and strong and will stand shipment. There is the perfect egg, just brought about by thinking the matter over carefully, and feeding intelligently.—From address by Henry Van Dreser.

PLANT MULBERRIES FOR CHICKENS.

A shade tree is often wanted in a chicken run. In fact, shade of this kind should be there as a protection in the heat of the summer days, says Practical Farmer. A gentleman who recognizes this, spoke to me recently of his wish to plant a tree there and mentioned the mulberry as his choice, because of the fruit it would afford the fowls. His choice was one of the ever-bearing sorts. I advised him to take one of the common Italian type, either the ordinary white or black fruited one or the Russian or Japanese, all of which belong to the same class. These all bear enormous crops of fruit, I think much heavier crops than the ever-bearing sorts, and some of them continue bearing almost as long a time as those known as ever-bearing. The ever-bearing ones are of the native type. Our woods contain the wild one, Morus Rubra. The fruit is large, and the foliage also is large and rough to the touch. Downing's Ever-Bearing is of the same nature; so is Hicks' Ever-Bearing. These have large, reddish black fruit, but it is not produced as abundantly as on the common small fruited ones. If planting for table use I would set one of the ever-bearing sorts; if for the use of the fowls, the Russian, Japanese or Italian.

FRUIT TREES AND POULTRY.

One of the greatest mistakes that the beginner in poultry keeping can make is to prepare a range for his birds barren of all shade. Fowls delight, and it is in fact their nature, to have access to woodland or underbrush, where they dig around the roots and devour the countless worms thus found, at the same time escaping the direct rays of the sun during the intense heat of the summer, says Fred O. Sibley in the Epitomist. It would hardly pay to provide such shelter unless it were likely to yield some degree of profit in addition to benefiting the hens; certainly not on valuable lands. Hence the advisability of selecting proper varieties of fruit trees and planting them in the poultry runs. Fowls and the right kind of fruit trees do well together, one being capable of netting nearly as much money as the other, and every acre of land not occupied by fruit trees is to a certain extent wasted or failing to produce all that it should. Provided the soil and location are suitable, pear, plum, cherry and apple trees may alike be planted in a poultry run. The point is to get good varieties of commercial fruit from reliable nurseries, and then set them far enough apart so that the trees will have room to grow and expand. If any dwarf varieties are selected, they, of course, should be placed much closer together. The proper

distance apart for plum trees is twelve feet; for cherry and apple trees, twenty feet. When first planted, the runs should be sown in blue grass and clover, as these will add greatly to the fertility of the soil, and until the trees have become established they should be surrounded by a fence of chicken wire. After that the fowls will do no harm to their roots—not even if the soil around and between the trees is stirred up and cultivated, as it should be, so that they can scratch and wallow in it. Indeed, poultry will in this way keep down insect pests, such as borers, grubs, caterpillars, worms and the like, by eating them as fast as they appear; moreover, when the fruits have grown sufficiently so that the rotten and wormy ones begin to fall off, and the worms that are in them grow and multiply on the ground, they will take care of these, and the fruit, as well as the worms, be good for them. The trees, on the other hand, will afford the poultry excellent shade during the heat of summer, and, all in all, the two will thrive together in a marvelous manner. Keep the trees properly pruned, remove any worms that may in the beginning secure lodgment among their foliage, turn up the soil about their base occasionally, and enrich it with a little manure every year, and poultry may be relied upon to give them about all the further attention that they will need.—Farm, Field and Fireside.

PROFIT IN BANTAMS.

While bantams are too small for table fowls, they will more than pay for their keep in the number of eggs they lay. They are excellent chickens for those who do not have room for a large poultry yard. Unlike other hens, bantams are not injured by confinement, and a flock of a dozen can be kept in a yard ten feet square. They are very small feeders and twelve hens will keep in good condition simply by eating scraps from the table. They will lay on an average 100 eggs a year and the eggs are almost as large as those laid by leghorns. The most profitable and handsome bantams are the black-breasted games. A small dry goods box will serve for their house.

GEESE FOR MARKET.

Geese pay because they require but little attention, are good foragers, are subject to few ailments, and bring good prices if the pure breeds are used, as the pure breeds will reach heavy weights. The old geese make better

layers and mothers than the young ones, and can be kept for breeding for years. As old geese are not readily salable in market, the young ones only should be sold.

Geese will eat all kinds of young grass or weeds, and they are very partial to purslaine, pig-weed, etc. They also find a large portion of their food on ponds, and should not be kept unless near a pond. They need no food in summer, but should be fed twice a day in winter. The Toulouse and Embden are the largest breeds, the latter being entirely white in color. Geese require a dry place at night. In winter they will thrive well on cooked turnips thickened with bran. The feathers are an item which should not be overlooked.

It is claimed by some that the goose, for the table, is superior to the turkey, its flesh being juicy, while that of the turkey is dry. A young goose is really a luxury when properly prepared for the table.

There is no idle season in poultry raising. Every day brings its duties, and it is through close atention to these that the business is made profitable.

IN DRESSING POULTRY.

When dressing poultry for market do not feed for at least twenty-four hours before killing, unless the birds are to be drawn, as the food in the crop will ferment and cause an unpleasant odor.

The best litter in the poultry house is the refuse from the hay loft. Hay seeds are regarded as invigorating, but the benefit derived from them is due to the work induced hunting for the seeds. A flock of hens will scratch and work all day in litter from the hay loft, as the seeds are a complete change to them. Being small and covered with the leaves and dust, the hens must work to get them. The leaves from clover hay will also be relished and are among the best food that can be supplied in winter.

POULTRY POINTS.

A good remedy for roup that I have used with success for a number of years is as follows: Put fifteen to eighteen drops of carbolic acid in pail of drinking water. This for every day prevention. For swabbing throat use two or three drops of acid in teacupful of water. Swab with feather. —A. B. Henry.

Each fowl showing evidence of cold or congestion is shut up in a small coop and given two grains of calomel at night, followed by a one-grain quinine pill night and morning for two or three days. If there is any discharge from nostrils, a few drops of camphorated oil are injected into each nostril. If any improvement is manifest in two or three days they are removed to a small room and a solution of copperas added to the drinking water. They are kept here for a week or two, or until they show a complete recovery. If, on the other hand, after two or three days' observation and treatment no improvement is manifested, the bird is killed and buried. —American Agriculturist.

Scaly leg is a filth disease, if it can be called a disease, it being caused by a tiny "mite" which burrows under the scales of the legs and toes; it lives and breeds there. The remedy is very simple and easy. It is only necessary to grease the legs with any kind of grease. An ointment of a third kerosene oil and two thirds lard is easily applied, and if well rubbed on (and in) half a dozen times, a couple of days apart, should kill the mites and the scales will come off. Don't pull off the scales that have become large; that will hurt the bird, something like pulling off your finger nails would hurt you. The great remedy is so easy, and the prevention of the trouble by simple cleanliness is so easy there is no sort of excuse for scaly leg; it is simply and purely "neglect."

C. A. Latham, a prominent poultryman of Massachusetts, who breeds very high class birds, has a method of feeding which is simplicity itself. He has in each pen self-feeding hoppers. These hoppers are traversely divided into different compartments and in each compartment is a different kind of feed. They are kept supplied at all times and his birds eat as much of each kind of feed as they like, mixing it to suit themselves. Mr. Latham's stock is always healthy and thrifty. He never feeds any wet or damp feed to his fowls, old or young. From the first, they are fed on dry feed and get it from the hoppers. Each hopper contains a variety of grains bran and middlings, and a compartment full of dry beef scraps, such as sold for poultry feed. This plan saves an immense amount of detail work and mussing with hot mashes and mixed feeds. If there is a "best way" to feed poultry, this plan would seem to be the best.

At a test at the Minnesota station regarding the digestibility of hard and soft boiled eggs, it was found that eggs boiled five or ten minutes at a temperature of 80 degrees were completely digested in a solution of pepsin, in five hours time, while eggs cooked but three minutes at 212 degrees required a longer period to digest.

The hens that have to hustle for all their living without any help from their owner are not those that will produce 200 eggs a year.

Do not be persuaded to sell the early hatched pullets which should make the best winter-layers or that promise best as breeders.

A dozen hens with a male when yarded and about twenty with him on free range are very good condition for general service. Have a good strong male bird not akin to the hens, if you want good "general purpose fowls." In and in-breeding is only allowable to a certain extent, and for certain purposes.

SIGNS OF HEALTH AND DISEASE.

When fowls are judiciously fed, given plenty of fresh, clean water (which many do not get), made to take exercise and their quarters kept clean and free from lice, there is comparatively no trouble with sickness, except in cases of contagion.

When the combs and wattles of fowls are bright red in color it indicates a condition of health.

When they are busy scratching, the hens laying and singing, and the cocks crowing, these are signs of health.

When you enter the hen house at night and hear no wheezing, it proves that there are no roupy fowls in the flock.

When the manure is hard and a portion is white, it indicates a healthy condition of the digestive organs.

When the edge of the comb and wattles are of a purplish red and the movements sluggish, there is something wrong.

When fowls lie around, indifferent to their surroundings, they are too fat, and death from apoplexy, indigestion or liver complaint will result unless the trouble is corrected. Feed nothing but grain and not too much of it, and make them scratch for it, every morsel.

When fowls are restless and constantly picking in their feathers, they are infested with vermin.

When young poultry, especially ducklings, appear to have a sore throat and swallowing is difficult, it is a symptom of the large gray lice on the neck.

CHICKEN MITES.

Chicken mites are the most common pests in nests and houses. Cleanliness is the best means of preventing their multiplication. They develop best in filthy nests and in cracks and under boards in chicken houses. Clean the house (move if portable) and then spray the house with kerosene oil emulsion. If possible apply tar in the cracks and under roosting boards and this will catch many which escape the spray. Clean and spray the infested houses and coops once per week and dip the infested chickens in weak kerosene oil emulsion, or a 2 to 4 per cent creolin solution. Never dip chickens in a poorly mixed kerosene solution. It will blister the skin if the kerosene is not thoroughly emulsified. The copper sulphate solution, if applied hot will kill mites. It should not be applied on chickens.

Kerosene emulsion is made as follows: Dissolve one-half pound of hard soap in one gallon hot water, add 2 gallons of kerosene and stir or churn until a milky mixture (or emulsion) is formed; now add 8 to 10 gallons of water; stir or mix with a spray pump, or keep the emulsion of soap, water and kerosene and use as much of it as you desire after diluting with 8 to 10 parts water.

Copper sulphate solution: Dissolve 4 to 6 pounds of copper sulphate (blue stone) in 20 to 50 gallons of water. Spray this over dusted or cleaned boards, walls, nests or other places. When dry, or the next day, whitewash with spray brush. If applied hot this copper sulphate solution will kill mites.—Dr. C. A. Cary, in Southern Ruralist.

DIRECTIONS FOR PACKING EGGS.

The following directions for packing eggs in water-glass are given: Use only perfectly fresh eggs. Stale eggs will not keep by any method of preservation. Clean out the vessel in which the eggs are to be packed (preferably a stone jar) by scalding with boiling water. Prepare the solution, using water that has first been boiled and then cooled to ordinary temperature.

To each fifteen quarts of water add one quart of water-glass. Pack the eggs into the jar and pour the liquid over them, covering the eggs completely. Do not wash the eggs before packing them, as this may injure their keeping qualities by removing a natural protective coating on the outside of the shells.

Keep the eggs packed in this manner in a cool, dark place, such as a dry, cool cellar.

Each day's gathering of eggs may be packed immediately after gathering them in the jar and pouring over them just enough of the solution to cover them. This is better than to hold the eggs for several days at the risk of their becoming stale in order to have a sufficient number to fill the entire vessel at one ime. In some of the warmer sections of the State, during the summer months, the temperature often rises high enough to start incubation in eggs. In such localities eggs must be packed soon after they are laid or kept in some cool place until they are to be packed.

Water-glass is a somewhat alkaline liquid, but the dilution is not injurious to the hands if they are dipped into it in packing successive gatherings of eggs or in removing eggs from the solution.

It is stated that eggs packed by this method will keep for some time (as long as four weeks) after they have been taken out of the preservative solution.

DISEASES OF POULTRY AND REMEDIES.

ROUP.

In case fowls should get the roup a good and tried remedy is this, in fact it has been proved reliable by different ones in light and bad form: Confine the sick fowls from the rest of the flock and allow them nothing else to drink except the following: To one gallon of water add one-half pound common copperas; sulphuric acid, one gill, or one-half fluid ounce. Do not cork up tight. Give about one teaspoonful to a quart of water; can be fed in any soft food. If these directions are followed closely, health will be quickly restored.

Dr. Sanborn, the New York poultry expert, says that fumigating poultry houses in which those affected with roup are confined, to prevent or cure that disease, is not a success. He adds: "It might be well to fumigate the house when empty, but you would find many dead birds if you attempted to do much when the hens were inside. There is no better and safer treatment for roup than kerosene oil on the surface of the drinking water with arsenite of antimony dissolved in the water. Every time the bird drinks she gets a little oil in the nostrils and throat and swallows her dose of antimony. Under this method of treatment I have seen some very sick flocks recover, with few deaths. Small doses of these remedies will do much to abate roup."

CATARRH.

This disease may be caused by roosting in poorly ventilated quarters or where the temperature changes too suddenly. Ten drops of tincture of

euphrasis in each pint of drinking water may be advised as the most simple remedy. In extreme cases, where a froth-like matter fills the eyes, the latter should be bathed with a pint of warm water to which has been added four drops of carbolic acid. If sores form on the head they should be thoroughly bathed with carbolated vaseline. The poultry house should have perfect ventilation and be fumigated at least once each week. A spoonful each of arsenate of antimony and coal oil added to the drinking water is also a good preventive as well as remedy.

INDIGESTION.

When the fowl becomes weak and its comb turns white it is many times due to indigestion resulting from an overworked liver. Separate the sick birds from the well ones and feed no meat. Give bulky feeds, such as bran mash just wet enough to make the particles stick together. It is much better to underfeed than to overfeed when the birds are suffering from this ailment. Give the birds all the grit they desire and once each day give them a feed of green cut cabbage, cutting it up fine and seasoning with a little salt and pepper. Set a pan of pulverized charcoal in the pen where they can partake of it at any time. Keep the house clean and well ventilated. Medicines are of little value.

SORE HEAD IN CHICKENS.

Sore head is nothing more than a blood disease and is easily controlled and cured. Sulphur in soft food, a teaspoonful to each dozen hens, feed every other day, will cure almost any case. If the heads are very sore, it may be necessary to rub the affected parts with carbonized vaseline, but mild cases will not require such treatment.

A few drops of tincture of iron in drinking water will materially aid in toning up the system and keep the blood in good condition.

BOWEL TROUBLES.

Dr. Salmon in an address says that too much green bone, meat meal or meat scraps fed the same day will work a great injury to the fowls. In pullets the combs will turn yellow, diarrhœa will follow, the bird will act drowsy and droopy till it finally dies. The doctor thinks that the badly diseased birds should be killed at once and the doubtful ones removed to quarters by themselves, where they should be fed grain and clover hay. Have no animal food in the mash. Fill hoppers with bran and grit. An hour before sunset feed a full ration of wheat and then see that no more than this is given. Medicine does little good in these

cases. If diet will not set these birds right, little else can be done with drugs. In addition to this the birds should have a liberal supply of pulverized charcoal, set where they may partake at any time.

SCALY LEGS.

Scaly legs are due only to neglect; and it is safe to say that one will never find a case among the poultry kept in well regulated yards.

The scales are caused by a tiny parasite which burrows under the skin of the legs. It is an easy matter to remove them, and still an easier one to prevent their appearance.

To remove them, rub the legs with a mixture of kerosene, lard and sulphur, and repeat twice a week until the scales disappear. To prevent them, saturate the roosts every week with kerosene.

EGGBOUND.

Irritation of the oviduct, causing the membrane to become dry and deficient in its normal lubrication, an abnormally large egg, or a too fat condition of the hen may cause difficulty in expelling an egg from the body and produce the condition known as eggbound. If the egg remains in the oviduct for a considerable length of time inflammation is produced, which finally develops into decomposition of the tissues and results in death. Fowls when eggbound are restless, going frequently on the nest, showing a desire to lay, and, in general, giving evidence of being in distress. Later they become dull and listless, remaining in this condition until death, if not relieved. The egg can usually be felt in the posterior portion of the abdomen. If the trouble is early discovered, inject a small quantity of oil into the vent, and gently try to work the egg out. If this treatment is unsuccessful, hold the lower part of the body in warm water for half an hour, or until the parts are relaxed; then treat as above. It may be necessary to break the egg, to allow the contents to escape, and remove the shell in pieces. After removal of the egg give soft, cooling feed.

Occasionally difficulty in laying an egg causes prolapsus or oversion of the oviduct. When this occurs the oviduct is partially turned inside out and protrudes from the vent. If the egg causing the trouble has not been expelled, remove it, wash the exposed portion of the oviduct with warm water, apply carbolated vaseline or lard, and return to its normal position by gentle pressure. In addition it is well to give the fowl three to five drops of fluid extract of ergot.

LIMBERNECK.

This disease, as its name indicates, is characterized by the limp condition of the neck, the fowl practically losing all control of the neck muscles, so that the head rests on the ground. This condition occurs in warm weather, and is caused by the fowls eating decomposed flesh in which a ptomaine has developed. This poison causes partial paralysis of the neck muscles and often results in the death of the birds. Maggots eaten by fowls do not cause the disease, except as they may contain the poison which they have obtained from the decaying flesh.

The best and most effective treatment is, of course, never to leave any dead fowls or other dead animals around, but to bury or burn all carcases. Treatment of sick birds is not usually very successful, but a teaspoonful of castor oil is sometimes effective.

CHOLERA.

This is a contagious disease caused by bacteria, and is usually brought in by the introduction of infected birds or by water or feed contaminated by the excrement of sick birds. It is also possible for fowls to be infected through wounds or even by the inhalation of germs in the form of dust. The symptoms include a great thirst and the voiding of feces, of which the part normally white is yellow. This is not a sure indication of the disease, for the same thing may occur as the result of other disorders. Diarrhœa is generally a prominent symptom, the droppings being thin and voided frequently, and in the later stages the yellow portion may change to green; the fowl becomes depressed, the feathers becom ruffled, the comb becomes pale or very dark, and the bird has a poor appetite. Sometimes the disease runs rapidly through a flock, destroying the greater part of the birds in a week, or it may assume a more chronic form, extend slowly, and remain on the premises for several weeks or months. Fowls affected with this disease usually die within thirty-six hours. Most so-called cases of cholera are simply diarrhœa.

In most cases medical treatment for cholera has proved unsatisfactory. The best method of combating this disease is to carry out strict sanitary precautions as regards cleanliness and disinfection, and to totally destroy the carcasses of dead birds. Droppings should be burned or thoroughly disinfected by mixing with a 10 per cent solution of carbolic acid. Disinfect the building by spraying thoroughly with a 5 per cent solution of carbolic acid, and then whitewash.

POULTRY INFORMATION.

NUMBER OF FEMALES TO ONE MALE.

Of the light, active breeds, such as the Leghorns and Minorcas, one male will be sufficient for a pen of twelve to fifteen females under ordinary conditions. In the case of the medium-sized fowls, such as the Plymouth Rocks and Wyandottes, one male should be provided for every ten or twelve females. With the heaviest breeds, like the Brahmas and Cochins, one male should not be mated with more than ten females. Where twenty to thirty females are kept in one flock no better means of securing fertile eggs is known than to keep two male birds, allowing one of them to run with the hens one day and the other the next day, having a coop or extra pen in which to keep the one not with the hens.

TEACHING THE CHICKS TO ROOST.

It is often advisable to teach the chicks to roost when eight to twelve weeks of age. When they are allowed to remain on the floor it is difficult to keep them clean and to keep them from crowding. If wide roosts —three to four inches—are used there is but little, if any, more danger of crooked breasts than if the chicks are allowed to remain on the floor. The chicks can generally be taught to roost by putting the perches near the floor and placing with them one or two old hens or older chicks that are in the habit of roosting. If this plan is inconvenient or does not prove effective, the chicks may be placed on the perches after dark for a few nights until they have learned to go there of their own accord.

HATCHING CHICKS.

There are two methods of hatching and brooding chicks—the natural, in which the chicks are hatched and brooded by hens, and the artificial, in which they are hatched in incubators and brooded in houses or in separate outdoor brooders. For the person with a small flock the natural method will be found the easier and less expensive. For the person, however, who has a hundred or more hens and intends raising large numbers of chicks, and for all who keep only the non-sitting varieties, the artificial method is the more practical. There is also the added advantage with the latter method of being able to hatch chickens at any time of the year.

WATER-GLASS.

Of the many methods which have been tried for preserving eggs on a small scale, none has proved more successful than the use of water-glass (sodium silicate). This is a very cheap product that can usually

be procured at not to exceed fifty cents a gallon, and one gallon will make enough solution to preserve fifty dozen eggs, so that the cost of material would not exceed one cent a dozen. Pure water that has been boiled and then cooled should be used. To each fifteen to twenty quarts of water one quart of water-glass should be added. The solution should be prepared, placed in the jar or other suitable vessel, and the fresh eggs added from time to time until the jar is filled, but be sure that there is two inches of the solution covering the eggs. The eggs should not be washed before packing, for washing injures the keeping quality, probably by dissolving the mucilaginous coating.

TIME OF HATCHING POULTRY EGGS.

Chickens	21 days
Pheasant	25 days
Duck	28 days
Peafowl	28 days
Guinea	25 days
Goose	30 days
Turkey	28 days

HOW TO RAISE YOUNG CHICKS.

In the spring is the time to get properly started in the care of young chicks, if you expect results later. The first six weeks of their life has more to do with their winning prizes than all the rest combined. If you stunt them, allow them to become crowded or lousy, you need not look for the blue ribbons in next winter's shows, in competition with breeders who avoid these defects.

Our own experience has taught us that when chicks are old enough to eat they should be forced to a reasonable extent, or in other words, given all the wholesome food they can properly digest. They should be kept free from vermin, and allowed ample room for exercise; at the same time do not allow them to become chilled.

If you are raising them by natural methods, we would suggest that the hen be confined, allowing the chicks their liberty to go and come as they please, that they will constantly be returning to the mother hen to be warmed up, acting very much as a human being would, coming to the fire to get warm and then going back into the air. But where you crowd too many bodies together, either artificially or under hens, and they are inhaling constantly the foul air from a number of bodies, you will soon find they will have a sleep look and loss of appetite. They will drink a

lot of water and eat but little, then pretty soon the bowel trouble, which is the most serious disease to be encountered in young chicks, will have done its work.

There are many simple methods of the rearing of young chicks naturally, which any one, no matter where situated, can adopt without much expense. An ordinary store box, about three feet long by two feet high, turned over on its side, makes an ideal nest or coop, provided some strips are added to the top to keep out the water and one board added as a sort of shed for the front, so that the beating rains cannot blow in. Add to this front an ordinary sellers' screen, such as you can buy at any hardware store, put it on a frame, the same size as the front of your box, and by fastening your chickens in at night you have a safe place from varmints of any kind, and by cleaning the box often, seeing that the mother hen is free from vermin, you will start your chicks in the direction of the blue ribbons.

Wholesome food, properly mixed, will very materially assist you in this direction. There are so many good feeds advertised at the present time that we believe it is cheaper, all things considered, to buy the feed than to mix it yourself. In case you are so situated that you cannot secure this feed, without trouble, we would suggest a diet of fine cracked corn, millet seed, cracked wheat and cracked Kaffir corn. These cereals properly mixed make an elegant food for young chicks, and they will do well on it.

If you have no feed that contains grit, then it will be necessary to add grit, pounded glass or crockery, either of which is elegant. Old broken lamp chimneys, flower pots or any kind of dishes that may have been broken around the kitchen are ideal poultry grit, and it is an easy job to demolish it by taking a flat stone and hammer and crushing it up. Some would think that ground glass would be injurious to chicks, but we have never found it so; in fact, the sharper the edges the better they seem to get along with it, as it lodges in the gizzard and is a mill of itself to grind the feed, then allowing it to enter into the stomach.

When hens are confined in boxes of this kind while the weather is uncertain it is well to make a small slide partion so that the chicks can go out, but still retain the hen. They will run away a few feet, but will come back constantly at the call of the mother, and are safe from cats or other varmints. They will find their way in at roosting time, as well as when sudden storms come up.

Where chicks are reared artificially, no more than fifty should be given to any brooder, regardless of size, if you expect them to mature and develop into prize winners. The greatest economy is in having a sufficient

number of brooders to properly raise your chicks to maturity, and it is not practical to change them from one location to another after they have become accustomed to one place of roosting. The best results we have ever obtained were where chicks were started and grown to roosting size without changing them from the brooder or the position of the run; in fact, the only way to make chickens grow is to keep them absolutely contented. The contented person is almost invariably fat and healthy, while the one who frets and is dissatisfied is just the reverse, and the same rule will apply to all branches of live stock. Any animal that is well cared for and is contented in its home will do well and give the very best results.

Breeders will often notice one or two females in a pen of mated birds that are constantly trying to get out. These birds will never give a good report of themselves, and the sooner they are moved to some other quarters the better, and the same rule will apply in young chicks. If they are satisfied with their quarters you can almost see them grow, while if cramped, crowded and filthy, you will meet with disappointment.

HOW TO DRESS AND PREPARE A CHICKEN FOR THE TABLE.

Keep in a coop and feed no bread or grain for at least twelve hours before dressing, that there may be nothing in the craw that would give to the meat an offensive odor. If rainy or cold weather, dress it indoors. Have water boiling. Wring the neck until you feel it break, but do not pull head off. Put one quart of boiling water and a dipperful of cold water into a lard pail, or other deep vessel. Hold the chicken by the head and press it down a moment, then raise it and try the feathers; if loose, remove it and insert the head. Now remove and quickly rub off the feathers, scarf-skin and all; if scalded before it quits kicking, rub briskly before it gets cool; there will not remain a hair or pin feather, and hence need no singing. Wash, cut off wings, legs and "pully bone," holding the head toward the entrails, cut along the backbone through the ribs to the neck on each side, and get two nice pieces of "breast." Cut the neck into two pieces. Unjoint the back and take out the oil bag.

Wash all the bloody pieces, rub salt on well.

To Fry—Have grease hot, pepper and dip in batter made of flour and water. Cover until brown, turn and brown, add a spoonful of water to produce a steam. Cover to keep steam in and to soften the chicken.

To make the Gravy—After removing the chicken stir a spoonful of flour and a pinch of salt and pepper into the hot grease; pour into bowl; then put a cup of sweet milk into the frier and let come to a boil; then pour into the bowl and stir, and serve while hot.

INCUBATORS.

The incubator for hatching poultry is now recognized as an important factor in the poultry yard. Incubators are now so perfectly automatically manufactured that any one may soon learn to operate the same with success. There is quite a difference in the make-up of an incubator. Some of the cheap kinds are almost useless, and before buying an incubator the prospective purchaser should be very careful in selecting a reliable one.

INCUBATION.

Natural incubation is performed by the mother hen; artificial incubation is performed through artificial heat. The success of incubation depends entirely either upon the care by the mother hen or the operator of the incubator. In addition to heat, the eggs require a certain amount of moisture and turning; the temperature must be kept from 100 degrees to 103 degrees. In buying an incubator the manufacturers furnish explicit directions for running the incubator, and which directions must be followed. One set of directions could not be applied to all incubators, even if the principle of incubation are the same.

NOTES ON INCUBATORS.

Before placing any eggs in the incubator, study the principles and note the heat and adjust the lamp, or other source of heat, to a nicety for a day.

The incubator should not be placed where there is a draft, sunshine or hot stove.

Keep all parts of the incubator and lamps scrupulously clean.

Turn every egg the third day.

After the eighteenth day do not disturb the eggs.

PART IX.

FROGS FOR PROFIT. DAIRYING, BEE-KEEPING AND MISCELLANEOUS.

FROGS AS A SOURCE OF PROFIT.

It is commonly supposed only French people eat frog legs; this, however, is erroneous. Undoubtedly the consumption of frog legs as a food supply originated in France. Evidently we have had enough French people and

FROGS

epicures emigrate to this country to educate the American and other nationalities to the fine flavor and texture of frog legs, and it is not uncommon to find frog legs on the bill of fare of every first-class restaurant in all of our cities.

At the present time frogs are known more by their noise than from any commercial value in the South, and the quantities of frogs in a pond must never be judged by the noise; four or five frogs in a duette from G flat to C minor, ending in a grand final chorus, will easily leave the impression that there are several hundred frogs in the pond. A farmer in Texas wrote a commission merchant in St. Louis, if they would buy frogs. The reply came: "Yes, we will buy all you have. How many can you ship us?" The farmer replied: "Oh, several thousand." The firm wrote back to ship them along. The farmer finally made a shipment of a dozen and a half of frogs, with the statement: "That's all I could get; I was fooled by their hollering."

It is not our intention to fool anyone with any useless noise, but we believe the Southern States is a chosen field for frog culture, and some attention should be bestowed upon the industry.

The value of frogs is now $1,000,000 a year, and constantly increasing. In fact, the consumption has virtually doubled in the last five years. The average price paid to hunters in the Southern territory is $1.00 per dozen, and the demand far exceeds the supply.

One frog will spawn 60,000 eggs, and the young frogs emerging from the eggs have many enemies, and in all probability hardly ten frogs will reach maturity out of the 60,000. Supposing these young frogs were protected, like the United States fish department protects young fish for a short time, until sufficiently grown in size to develop self-protection and turned loose in the swamps, rice ditches and canals, and in turn consume the mosquitoes, the great Southern pest. It is strange that our Department of Agriculture, ever alert to new development, should have overlooked this promising industry, and even our legislatures should make a light appropriation to investigate and foster the propagation of frogs in the South.

HUNTING FROGS.

Experienced frog hunters use a torch or a flash light lantern, the same as used by the fishermen on the coast for spearing flounders. The hunter either travels in a boat along the edges of the water or wades and shines a light into the frog's eyes; when close up the hunter simply grabs the frog and places him in a bag, and the frogs are also shipped in the bags by express. The best season for hunting fogs in the South is from April 1 to June 1. During this period the Northern markets are open for Southern frogs. There are certain houses in all of the markets which make a specialty of handling frogs, and of course these are always the ones who can get the best prices, as they have a regular established trade for frogs.

SHIPPING FROGS.

In many Southern localities there are concentration points where local merchants buy the frogs from the hunters and either ship them alive or dressed to the principal markets. Where there is ice available, kill the frogs by simply chopping off the heads, removing the insides, leave the saddle and legs together and pack neatly with cracked ice in strong boxes; state the number of dozens in each box on the box, and ship only by express to reliable houses. For information about firms always apply to the editor or manager of The Southern Shippers' Guide, where all information may always be had for the asking.

For close-by points frogs may be shipped alive in boxes or sacks. There is considerable risk of many dying in transit, which is quite a loss.

PROPAGATING FROGS.

Anyone living close to a water supply of rivers, lakes or irrigation ditches or canals, may propagate frogs with certain results, by fencing off a part with close wire netting, snake-proof, and place in this compartment a dozen or two frogs. As soon as the young frogs appear and begin to crowd they should be removed to other enclosures, until of sufficient age to be turned loose in the lakes, rivers or ditches. Young frogs may be fed with grits, cornmeal, refuse meat and offal from the house or garden.

WINE-MAKING IN THE SOUTH.

It is remarkable how little is known by the vast majority of people about the value of grape juice as a food and drink. It is practically correct to say that rich grape juice and wheat bread alone would furnish a complete food for man, but taken as a beverage alone, it stands without a peer, and from this standpoint deserves earnest consideration. The grape juice sold at soda fountains comes from New York State, there being no exception to this. The price paid for the juice in bottles wholesale is something over 40c per quart, and it is understood that the larger city soda fountains use as much as $100 worth of juice per month through the summer. It cost less than 40c per gallon to manufacture this juice, and it can be made from any grapes, which will flourish in all parts of the South. Here is an industry which any fruit grower may engage in with every prospect of reaping unusually large profits. The process of manufacture is easy. Ripe, clean grapes are broken and pressed, and to the juice thus obtained one pound of sugar per gallon is added. The juice is

then brought nearly, but not quite, to a boil in a porcelain kettle, then poured into bottles recently scalded, then corked and sealed. Prepared in this manner, the juice remains sweet and delicious indefinitely. It forms a healthful beverage and should appear on the fruit grower's table every day of the year, especially for the benefit of the women and children.

The process of wine-making is Nature's own, and all that is required of man is to furnish clean vessels in which to hold the liquid during the process. Clean, fully ripe fruit is necessary. This should be crushed with a clean wooden masher in a clean wooden tub or barrel, covered to prevent dust or insects reaching it, and allowed to pass through fermentation and at the end of three to five days the juice will have separated from the husks and can be drawn off into a clean, tight keg or barrel. Fermentation continues with greater or less vigor for several weeks, but finally the new wine becomes beautifully clear, usually along in November or December, after which it may be drawn off into another carefully cleaned cask and set away to use. From the time the fermenting juice, or must, as it is called, is drawn from the pulp barrel, the cask in which it is put should be kept full, either with similar wine from jugs kept for that purpose, or with water in which two pounds of granulated sugar per gallon has been dissolved. A grape leaf should be laid over the bung hole and on it a small sack of clean sand, the object of this being to allow the escape of gases from the fermenting wine and to prevent air and dust from getting in from the outside. After racking off a bung may be used to stop the hole. The entire process is simple, the chief requirement being cleanliness, and the resulting product is a simple, clean beverage developed by Nature for the benefit of man.

Even if it were impossible to grow cultivated grapes, which is not the case, it would still be possible for every fruit and truck grower to make wine sufficient for his home use at least from the native wild vines which usually are found about his pasture. The mustang makes a wine which rivals in quality some of the vintages of Europe, but in the case of this grape it is necessary, on account of its exceptional acidity, to add two pounds of granulated sugar to each gallon of must at the time it is drawn from the husks.

The "Possum" grape when fully ripe makes one of the most excellent of home wines, and by artificially training the wild vines the labor of gathering the fruit may be so reduced as to make harvesting quite practicable.

V. Champini, of which the Barnes variety is a good representative, makes a natural port wine by adding two pounds of sugar per gallon of must, and when fully aged would make an especially good tonic for invalids.

The cost of manufacture of these wines outside of the labor involved in gathering the grapes is very small, not over 25c per gallon for the finished wine, yet it will sell readily to town people for $1 to $1.50 per gallon. Hence by gathering three sugar barrels full of mustang grapes, adding $5 worth of sugar and making wine, a fifty-gallon cask may be filled, and within eight months of the time of gathering, the wine may be sold for at least $50, thus bringing more profit than could be obtained from an acre of excellent cotton. It is almost criminal to allow opportunities like this to pass by year after year without an attempt to take advantage of them. Along the fence and ravines, and about the fields and pastures many farmers annually allow grapes to waste, which, if converted into a marketable product, such as wine, would net him an income greater than that received from his entire farming operations. Surely the subject of wine-making is worthy of consideration.

Of the cultivated grapes nearly all make excellent wines, but the varieties which have proved most valuable fortunately grow readily in nearly every part of the South. The Herbemont is generally successful and makes a wine which brings the best prices on the market, and is especially delightful as a table drink. The Norton's Virginia flourishes in most locations, and makes a wine which is acknowledged as a specific for stomach trouble. The manner of its operation on the system is not fully understood, but it is known that the digestive fluids of the stomach are naturally acid, and if strong soda biscuits, or other kitchen products strong in alkali, are regularly eaten the stomach fluid is neutralized and indigestion results. The wine taken at meals adds acid to the food, thus neutralizing alkalis and aiding the stomach in its labors.

DAIRYING AND BUTTER MAKING.

The secrets of success or independence on the farm, in the orchard or garden consist mainly in the knowledge to utilize all of the farm, orchard or garden products to the very best advantages, and these advantages may be consistently arranged into three classes, of either selling the products in their raw state for cash in the markets; for home consumption, which equals cash consideration, or the products may be further developed for market requirements, to insure increased profits for the raw products.

The canning of fruit and vegetables, the poultry yard, the pigpen, the pastures for meat supply, and the dairy are all avenues of profits, or home independence on the farm.

The whole secret on the progressive farm is to sell the most and buy the least. If the first law of Nature is self-preservation, then self-sustaining is the first law of the successful agriculturist, who seeks contentment and wealth. Among all these aforesaid avenues there is none important or remunerative than the dairy cow.

The value of the dairy products, besides what the producer consumes exceed now over $8,000,000 annually in the United States, and the dairy States are by far the most prosperous in the Union, and not the manufacturing States, as one would assume.

There is no farm so poor or so cheap which cannot be made more attractive and more valuable by adding dairy revenues.

There is no farm so productive and so high priced but can be used with larger profits and to better advantage as a dairy farm.

It costs less to produce one pound of butter fat than one pound of beef or pork, and note the difference in the price.

The high state of perfection dairying in this country has already developed may be best illustrated by the official record of one cow in Iowa, which produced one thousand pounds of butter in 365 days last year. This same cow further broke her own record by producing this year 260 pounds of butter in sixty days. Such results can only be expected from high grade cattle and the most advanced methods of modern dairying The grades of cattle in the United States are constantly improving; the long-horn, milkless cow of Texas is becoming a thing of the past; the lean, scrub, fence-jumping cow is disappearing as fast as the razor-back hog; good substantial dairy cows may now be obtained more readily than a decade ago in most any part of our country.

THE BEST DAIRY COW.

(By the Blue Valley Creamery Co.)

A good milch cow is naturally a dairy cow, yet there is quite a difference between a good milch cow and a good dairy cow.

In selecting a cow for profitable dairying, the most prominent considerations are quantity and quality. She may give a large quantity of milk, but of such a poor quality as to make her unprofitable. She may give milk rich in butter fat, and yet such a small quantity that she does not pay. She may give a large quantity and a good quality, but give it such a short time as to be unprofitable. The cow with a large capacity, that eats heartily and converts her feed into milk, rich in butter fat, and works at it most of the time, realizes the greatest net profit and is the most desirable. In different breeds and among the different individual

cows of the same breed, one will excel in milk, another in butter fat, and another in economy of production. While there may be no infallible rule by which you can be governed in selecting a high class dairy cow, there are many points that will assist, and if carefully considered, will prevent disappointment, as a rule. Remember that a cow is a machine and is intended to change the different products on which she is fed into something of more value. There are two distinct types of these machines. One manufactures or converts this feed into beef; the other into milk. There is a very decided and pronounced difference in the type of the animal that manufactures beef, and the animal that manufactures milk.

AN IDEAL DAIRY TYPE.

In the dairy type you have an animal that is angular, thin, somewhat loose-jointed and with prominent bones. Wedge-shaped from the front, head lean, moderately long, face slightly dished and a general contented expression of the features. The muzzle large, mouth large, nostrils wide and open, a clear, full, bright eye, a broad, full and high forehead, ears medium size, fine texture, covered with fine hair and orange yellow inside. Neck thin, moderately long, with little or no dewlap, and the throat clean. Wide spaces between the jaws, the withers lean and sharp, the shoulders lean and oblique, the chest deep and wide (indicating vigor and constitution), the forelegs short, straight and fine-boned, a large heart girth (indicating a well sprung rib), a large development of the chest with consequent increased lung power, and a large capacity for storing and digesting the immense quantities of feed necessary for producing milk. The back should be high and lean, the spaces between the vertebræ should be far apart, wide and open, the loins broad and strong, held up well to the level of the back, the abdomen very large and deep, showing great capacity in the way of large room for digestive organs.

After all other good points are considered, the efficiency of the animal will be most determined by the qualities observed in the hind quarters. The hips should be wide apart and level with the back, the rump long, high and wide, the pin bones or thurls should be high and wide apart, the thighs should be thin, incurving but well muscled, and above everything a well developed udder and milking veins of the producing cow.

The udder should be large, extend well forward, full but not fleshy, and the quarters even. The attachment to the body should be as large as possible, not only extending well forward but well up behind also. The udder should milk out thoroughly, so that when empty it is much smaller and flexible. The milk veins, which may be observed in front of the udder,

should be large, elastic, as crooked as possible, and branching. The main milk vein enters the chest through an opening known as the milk well, and the milk well should be large. The milk well seldom changes in size. The milk vein is very much larger when the animal is in full milk than when she is dry. Therefore, the milk well may be regarded as a surer index in a dairy cow than the milk veins themselves.

CARE OF THE DAIRY COW.

Next in importance to the selection of the cow for the dairy, is her care. She may be ideal and yet fail to give results because of improper handling. The best draft horse may become useless as such, because of a balky driver. The fleetest race horse may lose his speed through improper handling and poor driving, so the record-breaking milk cow may go all to pieces and fail completely because of mismanagement on the part of her keeper.

It is very necessary that her manager should thoroughly understand her disposition, know her peculiarities and be able to anticipate her wants. He should fully appreciate her and through constant exhibition of sympathy preserve the closest relationship between them. He must be thoroughly interested in his business and in love with the cow, whose manager and keeper he is. It must be understood that of all the brute creation she is the most sensitive. She is a specialist. She belongs to a family that for hundreds of years has been bred for special work. She is refined. Her environments and her surroundings have been of the most fascinating and satisfactory character. She has had a good home. Her family have been used to good society and in return for all these most excellent conditions she has exerted herself to the utmost in her vocation. She has had nothing to worry her. She has been able to give her time and attention to converting the different kinds of feed into milk and because it has been a pleasure she has attained the most wonderful results and made herself most valuble. To continue these environments means a continuation of success; to change them means failure.

It must be remembered that the digesting of food, the making of blood and the elaborating of milk is labor the same as the labor of a draft horse, and her care should be in accordance with this fact. It is customary to give the draft horse an occasional rest. After a short season of racing the race horse is taken off of the track to recuperate and get ready for effectual work the next year. The man who works in the office, and the store, and the shop is accustomed to take an annual vacation. It should be borne in mind there is no animal or no person needs a rest more than the dairy cow, and for a reasonable vacation each year she will show her

appreciation by doing better work afterward. The cow's work, to her, is like brain work to a man, and she should be cared for accordingly.

It has been demonstrated that wonderful results can be attained by taking good care of a milk cow. It should ever be remembered that this cow is a mother and is giving milk because of her young. She demands a good comfortable place to stay. Give her a stall that is hers and let her know it by having her occupy it. When she is about to come in she should be put in a box stall or somewhere where she can be turned loose and be comfortable as well as isolated, and at this time she should have special attention. When the calf comes and has sucked and stood on its feet and been licked off, it should be removed, and if possible this should be done while the cow is absent, so as to cause as little confusion as possible. After the calf has been taken away, the cow should be petted, and she will appreciate it, because she needs a friend to comfort her on account of her loss. She needs to feel all the time that in her keeper she has a true friend, and in return she will show her appreciation by giving as large a quantity of milk as her capacity will permit.

FEEDING THE DAIRY COW.

Of all the animals on the farm for which the question of feeding must be decided, there is possibly none quite so important and that requires as much careful thought and intelligent directing as the dairy cow, because the kind, the amount and the quality of the feed are all essential to satisfactory results.

She is not only a machine that we use for converting different feed stuffs into an article of food that is indispensable and that we would produce in limited quantities at any cost, but she furnishes a market for the cereals and the grasses that are grown on our farms. She is liberal in the matter of price, so far as she is able to control it, and it is important that we should realize the valuable assistance we can render by intelligent feeding. She buys this feed for a two-fold purpose. Primarily she uses it to sustain life and furnish fuel. Next to this she uses it to make money to buy more feed with. For the first purpose she must have it at any cost, but aside from this she will only be able to get more for speculating purposes in proportion to her ability to compete with other markets.

She is a desirable market, because she is convenient and avoids long hauls, and for this reason she is entitled to our assistance in boosting the price. The first feed that a dairy cow gets she uses for herself. After that she begins converting the surplus into milk. This being the case.

the profit is in the surplus. For instance, suppose you feed twenty pounds of something and get fifteen cents' worth of milk, that would be three-quarters of a cent a pound for the feed, and then double the amount and feed forty pounds and get one dollar's worth, that would be two and one-half cents per pound for all the feed, or four and one-fourth cents per pound for the last twenty pounds, against three-fourths of a cent for the first twenty pounds.

The kind and amount of feed that should be given to a cow depends largely on what she is doing, and under no circumstances should a herd of milk cows be fed as a herd. Each one should be fed according to its particular wants and necessities. The cow that gives five gallons of 4 per cent milk a day needs more digestible food than a cow producing two gallons of 3 per cent milk. A cow that is giving four gallons of 3½ per cent milk needs more than when she is giving two gallons of 3½ per cent milk. The size of the cow as well as the amount of milk she is producing will have something to do with the amount of feed necessary.

Her feed must not only be sufficient in quantity, but it must be palatable, so as to be relished, and it must contain the right kind of nutrients and in proper proportion. As you are feeding the dairy cow for milk, her feed must be composed of the same nutrients that are contained in milk. These are divided into five classes: Water, ash, protein, carbohydrates and fats.

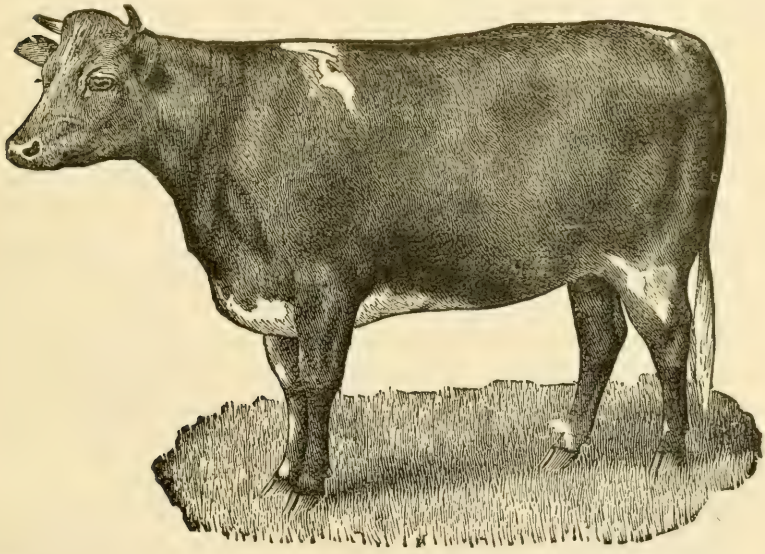
Water is very essential, but it is easily supplied at small cost. Ash or mineral matter is of minor importance, because all food stuffs have it in sufficient quantities. Protein is important. This makes muscle and forms casein milk. This is generally deficient in cow feed and it is absolutely indispensable, because there is no other substance that can perform the same function. Carbohydrates form a large part of the food consumed by animals. It is the part that furnishes heat to keep up the body temperature and the energy and muscular activity. It furnishes the constituents for making milk sugar and fat in milk.

Fat in food performs the same functions as carbohydrates. The principal difference is that fat is a more condensed form. Wherever one is in excess of the other, it will take its place. Where protein is in excess, it may take the place of the carbohydrate, but the reverse is not true, and under no circumstances can milk be produced without protein. When the feed given a cow contains all these elements or constituents in the proper proportion, it is called a balanced ration.

Oat straw has the necessary nutriment for making milk, but in order for a cow to get a sufficient amount to make five or six gallons of milk,

she would have to eat 250 or 300 pounds a day. As this is a physical impossibility, it is necessary to mix a large amount of something else with a small amount of oat straw in order to get a sufficient quantity of the material necessary to make this milk and still stay within her capacity. Roughage, that is raised on the farm, such as hay and fodder, should be cut at the proper stage before it becomes too ripe, and it is important that it be put up in the best possible condition.

Leguminous plants, such as clover, alfalfa, cowpeas, beans, etc., are rich in protein, and should be raised in sufficient quantity to supply this element that is so necessary.



There is nothing equal to fresh pasture as a balanced ration, but we cannot have it the entire year. When the summer advances and the heat increases, the pastures dry up and the necessity for some succulent feed to keep up the flow of milk is apparent. This can probably be best supplied by ensilage and root crops. It is highly necessary to keep up this flow, not alone because of the value of the milk at the time, but to prevent a permanent shrinkage, as it is practically impossible to restore the shrinkage after it has occurred. For keeping up the winter supply of milk, there is nothing superior to ensilage.

TO START A DAIRY.

There are certain requirements in profitable dairying, either in the commercial or home dairy on the farm, which must not be overlooked in establishing the plant.

As extreme cleanliness is necessary to produce either pure milk or pure butter and to maintain health among the herd, the dairy buildings should only be placed where there is absolute good surface and subdrainage and where there is always an abundance of water supply, either by a running steam, artesian wells or surface wells with engine or wind mill power.

Cement floors are highly commendable in the buildings, with sloping surfaces, to facilitate the flushing of the floor with pure water at least once a day; all of these conveniences tend to success and lighten the labor of the dairy farm. The next step would be to keep only good cows, feed them well and produce a high grade of cream and butter.

MILKING.

The dairy cow should be milked at the same time every day, both morning and evening. A failure to do this will result disastrously. She should always be milked by the same person. A change in milkers often has a tendency to diminish the quantity of milk given. The custom that prevails of milking the cow during the summer months before daylight in the morning and after dark at night, and during the winter months long after daylight in the morning and before dark in the evening, is a bad one, and will have a tendency to cause a shrinkage. Everything possible should be done to add to the comfort of the cow at the time, and to make the operation of milking as pleasant as possible. Care should be taken to keep the teats free from chap and sores of any kind.

The care of milk begins with the care of the cow. She must be healthy and well fed and well cared for, or she will show the effects in her milk. If she is fed too much or not enough, her digestion gets out of order and the milk will often be tainted. Milk will be tainted by certain feeds if not properly fed. Feeds that have a strong flavor should be fed just after milking, instead of before.

Milk should be kept perfectly clean, and in order to do this the cow and her stable must be kept perfectly clean.

The cow's udder should be wiped off carefully before milking, to prevent any dirt falling into the milk. Immediately after milking, the milk should be separated by a centrifugal separator and the cream cooled as quickly as possible and the skim milk fed to calves and pigs while it is

warm. The cream should be kept in a cool, clean place, where it cannot absorb odors of any kind, and it should be kept in a vessel that is scrupulously clean—one that has been thoroughly washed and aired. In the care of milk it should always be remembered that it is human food, and that it is the most sensitive to surroundings of any other food. The grade of butter made from the cream will depend entirely on the care that is given the milk. The milk should be removed from the stable as soon as possible, as it absorbs stable odors very quickly. Milk should be strained through two or three thicknesses of cheese cloth and the cloth should be rinsed in cold water, washed in warm water and scalded and dried in the sun.

The best place to cool milk is to put it in water. Don't fasten up tight—leave it so the animal heat and the gas can escape, by covering the can with cloth and stirring it occasionally until it is cool. Never mix warm milk or cream with cool.

Wash the separator thoroughly after each using, and thoroughly air every part of it. The least little particle of milk left sticking to separator parts is almost certain to taint the milk.

The importance of taking good care of milk and cream so as to get it to the market in good shape, grows more apparent every day. Never allow one milking to stand over until the next one before separating, because you only have a small amount and want to save trouble. This will not only make poor cream, but diminishes the feeding value of the skim milk.

The best results are attained in separating milk by making cream about 30 to 35 per cent.

BUTTER-MAKING.

The cream from each milking should be kept in a separate can; before churning put all the cream that accumulates and add 25 per cent water. Until churning time, keep the cream at a temperature of 60 degrees Far. In the summer the best temperature for churning is about 58 degrees Far.; in the winter it is better to increase the temperature to 65 degrees Far. Churn until the butter comes in particles as large as pepper seeds, then draw off the buttermilk and add water at 60 degrees Far. Pure salt of fine grain should then be added, about three-fourths ounce to one pound of butter.

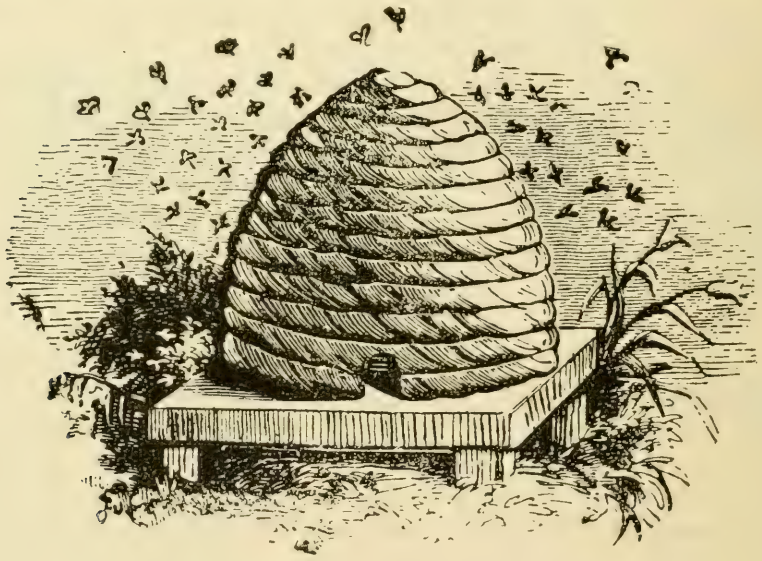
While the butter is being worked it should be kept quite cool. Work the butter the second time after it has stood one hour, to make sure all the salt has been dissolved. The butter may then be converted into rolls or prints of one pound each, neat and attractive.

PACKING BUTTER.

To keep butter for a few days until ready for market, immerse the rolls or prints in brine. Pack only one kind of the same flavor, color and body in one package; mixed lots are generally depreciated in price. Use only packages as boxes or tubs that are clean and neat to pack the butter in. The top of the butter should be covered with a clean white cloth. One inch of salt spread over the top of the cloth is very advisable.

BEE-KEEPING.

Aside from the pleasure derived from bee-keeping, the luxury of eating one's own honey fresh from the comb and the remunerative profits of the apiary, bees are useful insects in polenization or fertilization of many plants on the farm, orchard and garden. The pollen in the bloom of



BEES

many fruits and vegetables is so deeply hidden in the cups that ordinary natural fertilization cannot take place and in many species of plant life through the lack of pollenization barren trees and foliage of fruit is the consequence.

There is no agent or insect which performs this function of pollenization more industriously and complete than the ever busy little bee. It has been

demonstrated, beyond the shadow of a doubt, that when a hive of bees was placed in the greenhouse where early vegetables were being forced for early market, the crop was increased over 50 per cent by the presence of the bees, and there is not the slightest doubt but what the bees are most useful agents to all plant life for polinization.

Any place where farming, fruit raising or gardening can be successfully followed is adapted to the profitable keeping of bees.

PROFITS FROM THE APIARY.

A colony of bees, under normal conditions, will furnish from 25 pounds to 40 pounds per annum, or from $2.50 to $4.00, of marketable honey per colony. One peculiarity of bees, which deserves mentioning, is the fact that some persons may go near bee hives without the least hesitation about being attacked, while others are immediately considered enemies and suffer quickly in consequence from the bees. For instance, our better half may go to any hive without any protestation and cut out enough honey for the morning meal, when we would have to make tracks in other directions. Some explain this, that bees have a natural inclination for some persons and the reverse for others. In handling bees, one should go slow, as any quick motion will excite mistrust. Even if a bee lights on the skin, a quick slap would be immediately followed by a general attack of the whole swarm.

To avoid stings in handling bees it is always best to use the bee smoker and also the bee veil.

WHAT RACE OF BEES TO CHOOSE.

Since the gentler types are themselves excellent honey gatherers, and the particular advantages to be derived from some of the more energetic races which do not happen to be so mild in temperament are not likely to be secured by the beginner who is unfamiliar with the most approved methods of manipulation of such bees, it is strongly recommended that only the gentle ones be at first adopted—either Caucasians, Carniolans, or Italians. Should full colonies of these not be obtainable near home, colonies of ordinary bees may be changed by replacing their queens with queens of the desired race, the latter having been procured in small boxes by mail. If possible the introduction had better be made by an expert, although in general, by following the instructions which accompany the new queen, success will also be attained by the beginner.

A brief summary of the leading traits of the various races now in this country will be in use in guiding the purchaser, as well as instructive to him for reference.

Caucasians are natives of that portion of Russia lying between the Black and Caspian seas, are exceedingly gentle, good workers, good defenders of their hives, prolific, build many queen cells, and swarm often if confined to small hives. The workers are dark leaden gray in their general color, and present quite a ringed appearance because of the alternation of this dark color with the lighter fuzz which edges the segments of the abdomen. They also show frequently one to two yellow or leather-colored bands, are somewhat smaller bodied than Italians or Carniolans, have good wing expanse, and hence are nimble flyers. The drones are rather small and quite dark in color; queens not large; and vary in color from a coppery-yellow to a dark bronze.

Carniolans are much larger bodied and somewhat lighter gray in color than the Caucasians, but show likewise in many instances one or two rusty or dark-red bands. Their great hardiness and excellent wing power enable them to fly freely in much cooler weather than some other races stand, and to regain their hive entrances under adverse conditions. They are prolific, active and good honey gatherers, producing combs of snowy whiteness. As in the case of the Caucasians, their prolificness causes them to fill small hives to overflowing with bees, and this naturally results in numerous swarms. It is therefore advisable to use hives containing ten to twelve frames in the brood chamber. The nature of the Carniolans is essentially a quiet one, so that upon the approach of cold weather they settle down in a very compact and extremely quiet cluster, a condition which contributes in no small degree to their excellent wintering qualities. The drones are the largest of all drones of this species, and are covered with a thick coat of gray fuzz. The queens vary from a light color to a very dark leather color, the typical queen being, however, dark bronze, large, well rounded, strong and active.

Italians, the first of the foreign races to be introduced into this country, are much more widely known, and have with reason found great favor, since they are industrious, good defenders of their hives, and excellent honey gatherers, as well as handsome in appearance, being usually evenly marked with three yellow bands across the anterior portion of the abdomen. The blood has become so disseminated through the apiaries of the country that many hybrid bees having but one to two yellow bands are counted as Italians, and their cross disposition, derived through the males of the common race, is charged to the Italians. Strains of Italians pure in blood

have been bred by selection in this country until the three yellow bands have become so wide as to be nearly or quite joined, and in some instances nearly the whole abdomen is yellow. In general, however, as regards gathering powers it does not seem that any improvement has been made by this selection, the dark or leather-colored Italians proving, all in all, more vigorous, gentle and better honey gatherers, while as regards wintering they are also superior. It must be acknowledged, however, that the Italian race is slightly inferior in wintering qualities to all of the others which have been generally introduced into America.

Cyprians, from the island of Cyprus, may be taken as a general type with which to compare other eastern races. They are small bodied, more slender, in fact, than any of the European races of bees. The abdomen is more pointed and shows, when the bees are purely bred, three light-colored bands on the upper surface, and considerable yellow on the under side. Between the wing attachments on the thorax is a little prominence, shaped like a half moon, which is usually quite plainly yellow in color. The queens are small bodied, yellow in color, with more or less black at the tip of the abdomen. The drones have a heavy coat of fuzz on the thorax, and the abdomen presents a mottled yellow appearance, being often highly yellow. Cyprians possess longer tongues and greater wing-power than other races. This, combined with great prolificness and most remarkable activity, renders them the best of honey gatherers. In temper, however, they may be regarded as rather aggressive, rendering their management by any who are not experts extremely difficult. This feature may, however, be largely overcome by crossing the queens of this race with the drones of very gentle types. In this manner bees are produced that are readily amenable to smoke and ordinary methods in manipulation, combined with the excellent honey-gathering powers and prolificness of the eastern races.

Cyprio-Carniolans and Cyprio-Caucasians.—By crossing the Cyprian and Carniolan races a type might be developed which would combine the excellent traits of both of these. The first matings of Cyprians and Carniolans were made in 1883, in Carniola itself, thus insuring positively the fecundation of the Cyprian queens and Carniolan drones. Bees combining the blood of the two races in various proportions have since been tested for years in comparison with all other known races, with the result that the cross mentioned above has been found to exceed all of the pure races in honey-gathering powers, owing undoubtedly to the combination of great energy, hardiness, prolificness and wing-power, as well as greater length of tongue—a fact established by actual measurements. Similar results, with even greater

gentleness, may be expected from the cross obtained between Cyprian queens and Caucasian drones.

Syrian and Palestine or "Holy-Land" Bees.—What has been said of Cyprians may be taken to apply in a general sense to Syrian and Palestine bees, except that in these the good qualities are slightly less prominent, while some of the bad ones of the Cyprians are accentuated. No separate description of these is, therefore, particularly necessary in this place.

German, Common Black, or Brown Bees.—The bees commonly found wild, and cultivated to a greater or less extent, in this country, and known under the above name, are probably derived from early introductions from the old world. In comparison with the races above enumerated, they may be said to be inferior, since they possess the least energy in honey collecting, are less prolific, and not as good defenders of their hives. Under favorable conditions, however, as regards pasturage they may be relied upon for excellent results. They are, however, spiteful under manipulation, and have the disagreeable habit of running from the combs and dropping in bunches on the ground, likewise of flying from the hive entrance and attacking passers by. They are more easily discouraged than other bees during slack times as regards honey production, and this is doubtless the main reason for their generally inferior economic value.

WHAT HIVES TO ADOPT.

The suspended Langstroth frame is used more than any other in this country and all the other hives are nearly all on this principle.

There being no patent on the Langstroth hive, and accurately made hives being obtained at moderate prices from hive factories in various parts of the country, it is taken for granted that the enterprising beginner will adopt a simple form embodying this principle—the loose-fitting, suspended comb frame—as its main feature. The hive should not only be substantially built, but should have accurate bee-spaces and a close-fitting, rain-proof cover or roof. Factory-made hives, as a rule, best meet these requirements, as both lock joints and halved corners can only be made to advantage by machinery, and the expert hive builder understands, of course, the absolute necessity of great accuracy in bee-spaces, as well as the great desirability of good material and workmanship. Provision should also be made for winter protection.

For comb honey, hives permitting the insertion in the brood apartment of any number of frames up to eight, or frequently up to ten, are most in use. In securing extracted honey, those with ten to twelve frames in

each story are preferable, and as many stories, one above the other, are employed as the strength of the colony and a given harvest may require. A construction, therefore, which readily admits of expansion and of contraction, as occasion demands, is desirable.

As factory-made hives are superior and also quite cheap it is advisable to use them in preference to the home-made hive, especially in the commercial apiary. Upon application to our office we give full explanation where these hives may be obtained and the price of the same. This offer also applies to all other bee-keepers' accessories necessary in the apiary.

MANAGEMENT IN SWARMING.

Natural Swarming.—When a swarm is seen issuing or in the air, the best thing to do is, in general, simply to wait a bit. The weather is usually rather warm then, and rushing about to get tin pans, dinner gongs, spraying outfits, etc., aside from its disagreeableness, may get one so excited and into such a perspiration as to unfit him to do with the bees that which is likely to be necessary a few minutes later. The bees will probably gather in a clump on a tree or bush near the apiary, and however formidable getting them into the hive may at first seem, nothing will be simpler than shaking them into their new hive, or into a basket or box, from which they may be poured in front of the hive, just as one would pour out a measure of wheat or beans. If any stick to the basket or box, invert it and give a sharp thump with one edge against the ground. If the hive has been standing in the shade so that the boards composing it are not heated, and if it be now well shaded and plenty of ventilation be given above and below, the bees are almost certain to take possession at once and begin work actively. The securing of swarms can be made, however, even simpler than this by having the colonies placed several feet apart on a smooth lawn or dooryard and clipping one wing of each laying queen so as to prevent her flying. The prime or first swarm from each hive is accompanied by the old queen, and if she be clipped she will of course fall from the alighting board to the ground and may be secured in a cage. The bees will circle about a few times and return. Meanwhile the only thing for the attendant to do is to replace the parent colony by an empty hive. The returning bees will enter the latter and the queen may be allowed to go in with them, the cage being placed with its open end directly against the entrance to insure this. The swarm is thus made to hive itself.

The parent colony removed to a new stand a rod or more away will rarely give a second swarm. But to make certain all queen cells except

one may be cut out four or five days after the issuance of the first swarm. At the same time one-third to one-half of the remaining bees of the removed colony may be shaken at the entrance of the hive containing the swarm. This reduces the population of the parent colony greatly, but the loss is soon made good by the young workers emerging, and the new queen which will issue from the single queen-cell, spared when cutting out cells, will soon restock the hive with brood. The shaking out of additional bees, coupled with the removal of all queen cells but one, will prevent for the time all further swarming from the given hive, and in most instances end it for the season. The bees thus added to the newly hived swarm, even though too young to enter the field at once as honey gatherers, will nevertheless release from inside work an equal number of older bees, enabling the latter to go out as field bees.

Each after-swarm (second, third, etc.), it should be borne in mind, is accompanied by one or more unimpregnated queens, and these must not be clipped until they have flown out and mated. The regular deposition of eggs in worker cells may nearly always be regarded as a safe sign that mating has taken place. Eggs will usually be found in such cells within the first ten days of the queen's life. After-swarms may remain in the air, circling about for some time, and they frequently cluster high—a good reason, in addition to the more important fact that their issuance is not consistent with the production of the most surplus honey, for the prevention of all after-swarming.

INSECT AND OTHER ENEMIES.

The bee or wax moth (*Galleria mellonella* Linn.) is regarded by those unfamiliar with modern methods in bee keeping as a very serious enemy to success in this work. It was frequently such when only the common black bee was kept and the old way of managing, or rather of trusting to luck, was followed. But with the better races now introduced and with improved hives and methods, and especially with the care that is now given to have no colonies queenless long at a time, the wax-moth larvæ are no longer regarded with great concern.

Some species of wasps take a little honey at times—more particularly when hives are opened—and they annoy the bees; others capture and eat workers, as do also the large ant-like "cow-killers" (Mutillidæ), and certain predaceous flies (Asilidæ), true bugs (Phymatidæ), and neuropterous and orthopterous insects (Libellulidæ and Mantidæ). The larvæ of certain beetles (Dermestidæ and Tenebrio) feed upon pollen and the cast-off skins of developing larvæ and pupæ, and certain of the Meloid larvæ at-

tach themselves to the bodies of bees as parasites. Ants (Formicidæ) and cockroaches (Blattidæ), which gather above the quilts and between the quilts and the tops of the frames in order to be benefited by the warmth of the cluster of bees, sometimes help themselves to honey, and their presence annoys the bees more or less. Some of the insects here mentioned are only found locally, the predaceous ones being confined mainly to the South, while it may be said that the general welfare of strong colonies is not often materially affected nor the return noticeably reduced through the attacks of any of them.

Spiders, toads, and lizards destroy, in addition to many injurious insects, also some bees, and should be tolerated in the vegetable garden rather than in the apiary.

Swallows, kingbirds or bee martins, mice, skunks, and bears only occasionally commit depredations in the apiary.

Properly constructed hives enable the bees to limit in a great measure the injury which these various enemies might inflict, and the avoidance of overswarming, with care to insure the constant presence of a prolific queen and a supply of food suited to the needs of the colony at the time, will keep it populous and therefore in shape to repel attacks or to make good most of the unavoidable losses.

ROBBER BEES.

Robbing is sometimes a more serious matter, although it very rarely happens that a little careful attention just at the right time on the part of the bee keeper would not avoid all serious trouble on this score. When bees find nothing to gather during weather when they can still fly out they are easily tempted to appropriate the stores of weaker colonies. Exposure of combs of honey at such times may even occasion a combined attack upon a good colony otherwise quite able to take care of itself. It is then that the greatest destruction ensues, for such a colony will defend itself vigorously, and a pitched battle, with perhaps fifty or sixty thousand Amazons on either side, leaves the ground literally strewn with dead and dying.

If the invaders conquer, every drop of honey is taken from the few vanquished that are likely to be still alive; and in turn the despoilers invariably fight among themselves as to the possession of the booty. When the robbing takes place during the absence of the owner the condition of the robbed colony may not attract immediate attention and during warm weather moth larvæ gain full possession of the combs within a few days. When this condition is observed the whole damage is very likely to be at-

tributed to the moth larvæ. Colonies that have been left queenless for some time, and those weakened by disease or by overswarming, are especial marks fur such attacks. Of course there defects should be remedied whenever observed, but meanwhile, if legitimate field work is likely to be interrupted, every colony should be assisted in protecting itself against assault by having its hive made secure and the entrance such a narrow pass as to enable a few workers to repel attack there.

Should robbers get well started before being observed, the entrance of the hive should be narrowed at once, and wet grass or weeds may be thrown loosely over it, or a pane of glass may be stood against the front of the hive in a slanting manner to confuse the intruders. In extreme cases the attacked colonies may be removed to a cellar for a few days, plenty of ventilation being given during confinement, and a new location, apart from other colonies, selected, on which they are to be placed just at nightfall; or, instead of putting them in the cellar, they may be taken a mile or more away and returned only when the danger has passed. With these precautions, little loss is to be feared on this score.

In general, the intelligent owner who gives careful attention to certain important points in bee managing finds that he very rarely has disease to contend with, and that the reduction of profits through the depredations of bee enemies is not, in most parts of the Union, a serious discouragement. Although it seems that te risks in these directions are even less in bee keeping than those usually met in the keeping of other animals, which, like bees, are legitimately made to contribute to the wealth of the individual and of the nation.

BASKET WILLOW GROWING.

There are very many farms which contain some low land through which runs a small stream, and besides we have all the bottom lands which occasionally will nearly every year overflow. Those lands are too often allowed to run to waste, dense growths of weeds and scrub prospering in the rich, moist soil.

Willow planting generally is done in the autumn; should be in rows, the sets or cuttings, according to older methods, being placed about ten inches in length and planted in the ground until only an inch and a half protrudes above the ground. Willows are planted from nine inches to a foot apart in rows two and one-half feet to a yard distant from one another, thus allowing from about 14,000 to 23,000 to the acre. This method

of wide planting is followed for several reasons, it, of course, being cheaper to plant fewer cuttings and the cost of cultivation being reduced, the wide rows allowing for the use of a plow. It is also understood that the more shoots from a stool or stump the greater the yield. Where the cuttings have been planted on meadow or corn land the first year the rows are hoed two or three times and later run through with a light plow. After the first year only the plow is used for the cultivation. On bottom land, however, they are only cultivated once, and thereafter only grassed with a sickle.

The close planting of willows will yield both a heavier crop and longer, more even sized and better rods are obtained—straight, less branchy and less tapering. When willows are planted close together, all weeds and grass, the foes of the willow, should be kept out.

Osiers should be cut the first year, even if no valuable material can be obtained, for if this is delayed until the second year, there is apt to be a tendency to branch, so that less valuable material can be cut. This cutting should be done during the winter, and as near the ground as possible. The bundles of these cuttings should then be kept in fresh, if possible in running, water, until sprouts appear, when they will be ready to peel. Willow thus peeled is of a fine white color, while those which are treated by steam or boiling for the removal of the bark are of a dark color, but experience has shown that baskets made of boiled willow are more durable than those made from the white rods of spring peeling. The operation is so simple that old persons incapable of arduous labor can make fair wages doing this sort of work.

And yet the people may ask, is there a market for willow-ware in this State? Ask the merchants dealing in baskets where they have to buy the necessary supply. We send baskets for all purposes, and even baskets not looking so fine, but rough, would be in demand not alone in the towns, but among the farmers. The manufacture of willow is what might be termed a "house industry," in which the men, women and children are engaged in peeling and splitting the rods and weaving the baskets. In Europe many a farmer raises willows and makes his own supply of baskets, besides supplying his neighbors and friends. Why not try this industry in the South?

PART X.

USEFUL RECIPES AND INFORMATION FOR ORCHARD, GARDEN AND POULTRY YARD.

ACRES.

SQUARE RODS AND FEET IN ONE ACRE.

An acre contains 43,560 square feet.

A plat of ground 208¾ feet square is very nearly an acre, being just 1-16 of a rod over. A nearer approximation is 208 feet and 8½ inches. The square of this number differs less than a foot from an acre, being 43,559 1-6 feet.

A plat of ground 12 rods, 10 feet and 8½ inches square is an acre. For ordinary purposes it will answer to take a plat 12 2-3 rods square, which will give 160 2-5 rods, 160 being an acre.

An acre is contained in a plat 3 by 53 1-3 rods, or 4 by 40, or 5 by 32, or 6 by 26 2-3, or 7 by 22 6-7, or 8 by 20, or 9 by 17 7-9, or 10 by 16, or 11 by 14 6-11, or 12 by 13 1-3. Our farmer boys can soon learn this last table, and it will often be of use to them.

AGES OF ANIMALS.

Animal.	Years.	Animal.	Years.
Whale, estimated	500	Cow	20
Elephant	400	Deer	20
Swan	30	Rhinorceros	20
Tortoise	100	Swine	20
Eagle	100	Wolf	20
Raven	100	Cat	15
Camel	100	Fox	15
Lion	70	Dog	10
Porpoise	30	Sheep	10
Horse	30	Rabbit	7
Bear	20	Squirrel	7

ANTIDOTES FOR POISONS.

For Caustic Soda.—Potash volatile acid mixed with vinegar or lemon juice, and drink copiously.

For Nitrate of Silver.—Drink strong salt water.

For Strychnine.—Nux vomica or mustard as an emetic.

For Bedbug Poison or Paris Green, Lead, Zinc or Vermilion.—Give immediate doses of milk or white of eggs.

Arsenic Poison.—Give emetic at once of mustard and salt and follow with sweet milk, oil or butter melted.

Carbolic Acid Poison.—Give flower and water in large doses.

For Agua Fortis, Muriatic Acid, Oil of Vitriol.—Mix soap and magnesia; a drink every three minutes.

Copperas Poison or Lye.—Give immediate emetics of soap or mustard.

For Laudanum, Morphine, Opium.—Give strong coffee and tea, followed by emetics of ground mustard or grease; keep the patient in motion and allow no sleep.

The safest plan if poison is unknown is to give emetics of mustard or soap suds.

APPLES AND POTATOES.

TO FIND NUMBER OF BUSHELS IN BIN OR BOX.

Rule: Multiply the length, breadth and depth together, all in feet, and this product by 8, pointing off one figure in the product for decimal.

Example: How many bushels of apples are there in a bin 12 feet long, 3 feet wide and 4 feet deep:

$$12\times3\times4=144\times.8=115.2.$$

Answer: 115.2 bushels.

AVERAGE ANNUAL RAINFALL IN THE UNITED STATES.

Place.	Inches.	Place.	Inches.
Neah Bay, Wash. Ter.	123	Savannah, Georgia	48
Sitka, Alaska	83	Springdale, Kentucky	48
Ft. Haskins, Oregon	66	Fortress Monroe, Virginia	47
Mt. Vernon, Alabama	66	Memphis, Tennessee	45
Baton Rouge, Louisiana	69	Newark, New Jersey	44
Meadow Valley, California	57	Boston, Massachusetts	44
Ft. Tonson, Indian Ter.	57	Brunswick, Maine	44
Ft. Myers, Florida	56	Cincinnati, Ohio	44
Washington, Arkansas	54	New Haven, Connecticut	44
Huntsville, Alabama	54	Philadelphia, Pennsylvania	44
Natchez, Mississippi	53	Charleston, S. Carolina	43
New Orleans, Louisiana	51	New York City, N. Y.	43

Gaston, N. Carolina	43	Ft. Leavenworth, Kansas	31
Richmond, Indiana	43	Detroit, Michigan	30
Marietta, Ohio	43	Milwaukee, Wisconsin	30
St. Louis, Missouri	43	Penn Yan, New York	28
Muscatine, Iowa	42	Ft. Kearney	25
Baltimore, Maryland	41	Ft. Snelling, Minnesota	25
New Bedford, Massachusetts	41	Salt Lake City, Utah Ter.	23
Providence, Rhode Island	41	Mackinac, Michigan	23
Ft. Smith, Arkansas	40	San Francisco, California	21
Hanover, New Hampshire	40	Dallas, Oregon	21
Ft. Vancouver	38	Sacramento, California	21
Cleveland, Ohio	37	Ft. Massachusetts, Colorado	17
Pittsburg, Pennsylvania	37	Ft. Marcy, New Mexico Ter.	16
Washington, D. C.	37	Ft. Randall, Dakota Ter.	16
White Sulphur Springs, Va.	37	Ft. Defiance, Arizona	14
Ft. Gibson, Indian Ter.	36	Ft. Craig, New Mexico Ter.	11
Key West, Florida	36	San Diego, California	9
Peoria, Illinois	35	Ft. Colville, Wash. Ter.	9
Burlington, Vermont	34	Ft. Bliss, Texas	9
Buffalo, New York	33	Ft. Bridger, Utah Ter.	6
Ft. Brown, Texas	33	Ft. Garland, Colorado	6

AMOUNT OF BARBED WIRE REQUIRED FOR FENCES.

Estimated number of pounds of barbed wire required to fence space or distances mentioned, with one, two or three lines of wire, based upon each pound of wire measuring one rod (16½ feet).

	1 Line.	2 Lines.	3 Lines.
One square acre	50 2-3 lbs.	101 1-3 lbs.	152 lbs.
One side of a square acre	12 2-3 lbs.	25 1-3 lbs.	38 lbs.
One square half-acre	36 lbs.	72 lbs.	108 lbs.
One square mile	1280 lbs.	2560 lbs.	3840 lbs.
One side of a square mile	320 lbs.	640 lbs.	960 lbs.
One rod in length	1 lb.	2 lbs.	3 lbs.
100 rods in length	100 lbs.	200 lbs.	300 lbs.
100 feet in length	6 1-16 lbs.	12⅛ lbs.	18 3-16 lbs.

BITES AND STINGS BY INSECTS.

A mixture of equal parts of bismuth and glycerine generally affords relief. Should the part show inflammation, apply diluted carbolic acid; one part of acid to thirty parts of water; saturate a flannel cloth and place over the parts; change every half hour; give the patient also salts or castor oil to keep the bowels open. For bee or wasp sting there is nothing better than the application of weakened ammonia; if the sting is still in the flesh it should be removed with the tweezers or knife.

Horses are liable to be stung by hornets, wasps and bees. If there are only one or two stings made, no interference is necessary, but sometimes a larger number of poisonous punctures have been made, and then the best treatment is the application of spirits of turpentine and laudanum in equal proportions.

The bites of the gadfly are so troublesome in their effects that it is sometimes desirable to prevent them if possible. This is done by making a strong infusion of the green bark of the elder, washing the flanks, etc., with it before going out.

TO DESTROY ANTS.

Black ants may be easily dispersed by scattering around their abodes green or dried wormwood. Either red or black ants may also be dispersed by scattering powdered borax around their walks. Oil of turpentine placed around the cracks of floors or walls generally drives them away.

REMEDY FOR BLINDNESS OF POULTRY.

Laudanum ..... 1 teaspoonful.
Water ..... 1 teaspoonful.

Drop a few drops into the chicken's eye and bathe the chicken with warm water.

NUMBER BRICK REQUIRED TO CONSTRUCT ANY BUILDING.

Superficial Feet of Wall	Number of Bricks to Thickness of					
	4 inch	8 inch	12 inch	16 inch	20 inch	24 inch
1	7	15	23	30	38	45
1	7	15	23	30	38	45
2	15	30	45	60	75	90
3	23	45	68	90	113	135
4	30	60	90	120	150	180
5	38	75	113	150	188	225
6	45	90	135	180	225	270
7	53	105	158	210	263	315
8	60	120	180	240	300	360
9	68	135	203	270	338	405
10	75	150	225	300	375	450
20	150	300	450	600	750	900
30	225	450	675	900	1,125	1,350
40	300	600	900	1,200	1,500	1,800
50	375	750	1,125	1,500	1,875	2,250
60	450	900	1,350	1,800	2,250	2,700
70	525	1,050	1,575	2,100	2,625	3,150
80	600	1,200	1,800	2,400	3,000	3,600
90	675	1,350	2,025	2,700	3,375	4,050
100	750	1,500	2,250	3,000	3,750	4,500
200	1,500	3,000	4,500	6,000	7,500	9,000
300	2,250	4,500	6,750	9,000	11,250	13,500
400	3,000	6,000	9,000	12,000	15,000	18,000
500	3,750	7,500	11,250	15,000	18,750	22,500
600	4,500	9,000	13,500	18,000	22,500	27,000
700	5,250	10,500	15,750	21,000	26,250	31,500
800	6,000	12,000	18,000	24,000	30,000	36,000
900	6,750	13,500	20,250	27,000	33,750	40,500
1000	7,500	15,000	22,500	30,000	37,500	45,000

BUG POISON.

The application of corrosive sublimate and muriatic acid, equal parts, dissolved in four parts of water is a powerful remedy for bed and all other bugs and ants. Great care must be used in handling the mixture, as it is poisonous.

BUSINESS LAWS IN BRIEF.

Ignorance of law excuses none.

It is a fraud to conceal a fraud.

The law compels no one to do impossibilities.

An agreement without consideration is void.

Signatures made with lead-pencil are good in law.

A receipt for money paid is not legally conclusive.

The acts of one partner bind all the others.

Contracts made on Sunday cannot be enforced.

A contract made with a minor is invalid.

A contract made with a lunatic is void.

Contracts for advertising in Sunday newspapers are invalid.

Each individual in a partnership is responsible for the whole amount of the debts of the firm.

Principals are responsible for the acts of their agents.

Agents are responsible to their principals for errors.

A note given by a minor is void.

It is not legally necessary to say on a note "for value received."

A note drawn on Sunday is void.

A note obtained by fraud, or from a person in a state of intoxication, cannot be collected.

If a note be lost or stolen, it does not release the maker; he must pay.

The indorser of a note is exempt from liability if not served with notice of its dishonor within twenty-four hours of its non-payment.

CABBAGE TO KEEP.

When the cabbage is ripe and hard and before heavy frosts fall, pull the heads up by the roots and place them in pits in the ground, heads down; cover with straw and earth to keep the frost out, or fix a strong string around the stalk and suspend the cabbage from the timbers of the ceiling, head downward. The cellar should be cool and dry. This will preserve them with a certainty. Another good method is to cut the cabbage from the stump, pack close in a cask, taking care to fill up all the vacancies with dry chaff or bran, and keep in a dry cellar.

CABBAGE WORMS.

Cabbage worms may be destroyed effectually by sprinkling the cabbage during the hottest part of the day with ice-cold salt water; any part of the water striking the worms will immediately kill them.

CAMPHOR A CURE FOR CHOLERA.

The following simple remedy was issued in hand-bill form by the Hibernia Printing Office, Dublin, Ireland, during the severe visitation of the cholera in 1836, and was the means of saving thousands of lives. It was also used with valuable effect in 1848, and we would advise its use again should that epidemic visit our shores. In any case, however, no harm could be done by having it in the house during the warm months.

Dissolve one ounce of camphor in six ounces of spirits of wine and give a small bottle of it to any intelligent person in your neighborhood who will undertake to administer it to his poor neighbors when they are seized with cholera or any of its symptoms, without deviating in the slightest degree from the following instructions:

When any person is seized with symptoms of cholera, such as vomiting, purging, sudden weakness, coldness, cramps or spasms, do not give them brandy or whiskey or any kind of medicine whatever, but put them to bed at once, covering them warmly, not overloading them with bed clothes and as soon as you possibly can let the patient take two drops (not more) of the camphor mixture on a little pounded sugar in a spoonful of cold or iced water. In five minutes after let him take a second dose of two drops in the same way, and in five minutes more repeat the same thing. He is then to wait ten or fifteen minutes to see whether or not there is a sense of returning warmth, with a disposition toward perspiration and manifest decrease of sickness, cramps, etc., when, if necessary, he must take two drops, as before, and repeat the dose every five minutes until twelve or fourteen drops have been taken. In administering this remedy you must particularly observe that if the patient takes anything of any sort or kind, except cold or iced water while the medicine is intended to operate, its whole effect will be destroyed, for the least foreign medicine will neutralize the camphor, which is given to check vomiting and to produce a free warm perspiration. The use of cold or iced water is given on the advice of the late celebrated and successful Dr. Paddock, of London, who always allowed his patients to drink cold or iced water, as it tends to promote free perspiration, and also the abundant discharge of yellow bile.

The patient must not be allowed to rise and expose him or herself to the slightest degree of cold, and should not be tormented with baths, steamings or rubbing of any kind, but permitted to lie still, as he will fall asleep when perspiration comes on, and after some hours will, with God's assistance, awake well, though weak and languid and perhaps a little feverish, in which case he may get a dose, say a teaspoonful of Gregory's powder or rhubarb and magnesia, with a little peppermint water or weak sal volatile and water to wash it down, but must be kept quiet, taking only a little soup, broth or gruel for a day or two.

Lord Ponsonby writing to his brother, the Bishop of Derry, stated that to his knowledge these camphor drops had proved to be a certain cure for cholera, both in France and Germany, whenever taken in time, and the cure is generally effected before it is possible to procure a physician—that is less than in an hour.

HOW TO DESTROY CATERPILLARS.

Take a chafing dish with lighted charcoal and place it under the branches of the tree or bush whereon are the caterpillars. The vapor of the sulphur, which is death to these insects, and the suffocating freed air arising from the charcoal will not only destroy all that are on the tree, but will effectually prevent the shrubs from being, at the season, infested with them. A pound of sulphur will clear as many trees as grow on several acres.

Another method of driving these insects off fruit trees is to boil together a quantity of rye, wormwood and common tobacco (of equal parts) in common water. The liquor should be very strong. Sprinkle this on the leaves and young branches every morning and evening during the time the fruit is ripening.

CATTLE FOOD TO TONE UP SYSTEM.

Locust meal, 6 pounds.
Corn meal, 12 pounds.
Linseed meal, 4 pounds.
Sulphur, 1 pound.
Saltpeter, 1 pound.
Common salt, 2 pounds.
Gentian, ¼ pound.

Sulphate of iron, ½ pound.
Aniseed, ¼ pound.
Ginger, 1 pound.
Mix two tablespoonfuls with feed at night.

CEMENTS.

Cement for injured trees may be made with one part of wood ashes, one part of yellow ochre, five parts white lead, one part turpentine and one part linseed oil.

CEMENTS FOR DRAINAGE.

Pipes may be made by one part of water, cement and three parts of sand. The cement and sand must be mixed before adding the water and freed from all vegetable or foreign matter. The cement must be of good quality.

Floor cement for cellars, barns and outhouses should be made of one part cement and five parts of sharp sand. Mix with water until the mass works well and spread on the floor two inches thick; smooth down with shovel and finish with the trowel.

To make concrete walks, dig out a foundation two feet deep, fill in with brickbats or coarse shell; let this settle and tramp well; take one bushel of coarse sharp sand and mix with one barrel cement; spread this on the foundation to the height required; tramp solid; finish with pure cement mortar and trowel.

CEMENT FOR LEATHER.

Twelve parts gutta percha.
Three parts India rubber.
One part pitch.
One part shellac.
One part linseed oil.
Melt all together and apply hot.

CEMENT FOR GLASS.

Isinglass, one part, put in four parts of water and add four parts of glacial acetic acid.

CEMENT FOR STOVES.

Mix equal parts of ashes and salt with tepid water and apply to cracks while the stove is cold.

IRON CEMENT.

Two parts iron filings, one part clay; pound up two parts of fire brick. Mix the whole with warm salt water.

COMPOSITION WATERPROOF FOR BOOTS.

Dissolve by heat one ounce pure bottle India rubber shavings in one quart neat's foot oil, and add two ounces tallow. This makes a fine waterproof composition for boots, and is recommended to sportsmen.

VEGETABLE TIME TABLE.

LENGTH OF TIME REQUIRED TO COOK GARDEN VEGETABLES.

Young fresh garden products require less time for cooking than older ones. One important rule should be followed, namely, when vegetables have been cooked tender remove from the fire as soon as possible, and remove the water, where there is an excess, as in potatoes or beets. An experienced housewife gives th following time table for the preparation of vegetables:

Bake potatoes, 30 to 45 minutes.
Steam potatoes, 20 to 40 minutes.
Boil potatoes (in their skins), 20 to 30 minutes.
Boiled potatoes (pared), 25 to 45 minutes.
Asparagus (young), 15 to 30 minutes.
Beets (young), 45 minutes.
Corn (green), 12 to 20 minutes.
Cauliflower, 20 to 40 minutes.
Lima or shell beans, 45 minutes to 1¼ hours.
Onions, 30 to 60 minutes.
Oyster plant, 45 to 60 minutes.
Peas, 20 to 60 minutes.
Parsnip (young), 30 to 45 minutes.
String beans, 30 to 60 minutes.
Summer squash, 20 to 60 minutes.
Turnips (young), 45 minutes.
Tomatoes (stewed), 45 to 60 minutes.

When vegetables are served with boiled salt meat, they must be cooked in the liquor from the meat after it has been removed.

CORN, TO MEASURE IN THE CRIB.

Rule 1: Measure the length, breadth and height of the crib, inside the rail; multiply them together and divide by 2; the result is the number of bushels of shelled corn.

2nd. Level the corn so it is of equal depth throughout, multiply the length, breadth and depth together, and this product by 4, and cut off one figure to the right of the product; the other will represent the number of bushels of shelled corn.

3rd. Multiply length by height, and then by width, add two ciphers to the result and divide by 1241; this gives the number of bushels of ear corn.

TO MEASURE GRAIN IN THE GRANARY.

Divide the cubic feet by 56, and multiply by 45, and the result will be struck measure.

CREOSOTING FENCE POSTS AND GRAPE TRELLISES.

The posts are first deprived of all water by exposure to the sun, then artificially heated and plunged in a trough containing creosote to replace the water; several immersions are advisable. Posts served in this way are indestructible.

EMULSIONS.

(See Part IV of this book.)

ESTIMATING MEASURES.

A pint of water weighs nearly one pound, and is equal to 27 cubic inches, or a square box 3 inches long, 3 inches wide and 3 inches deep.

A quart of water weighs nearly 2 pounds, and is equal to a square box of about 4x4 inches, and is 3½ inches deep.

A gallon of water weighs 8 to 10 pounds, according to the size of the gallon and is equal to a box 6x6 inches square and 6, 7 or 7½ inches deep.

A peck is equal to a box 8x8 inches square and 8 inches deep.

A bushel almost fills a box 12x12 inches square and 24 inches deep, or 2 cubic feet.

A cubic foot of water weighs nearly 64 pounds (more correctly, 62½ pounds) and contains 7 to 8 gallons, according to the kind of gallons used.

A barrel of water almost fills a box 2x2 feet square and 1½ feet deep, or 6 cubic feet.

Petroleum barrels contain 40 gallons, or nearly 5 cubic feet.

FIREPROOF PAINT.

Take 20 pounds powdered glass, 20 pounds powdered porcelain, 10 pounds of powdered stone, 10 pounds calcimed lime and 30 pounds of waterglass; mix the solid ingredients well, then add the waterglass and thin with rainwater down to the thickness of heavy paint; apply with a stiff brush to roof or building desired to make absolute fire proof.

FLIES, TO DRIVE FROM STABLE.

Scatter chloride of lime on a board in a stable to remove all kinds of flies, but more especially biting flies. Sprinkling beds of vegetables with even a weak solution effectually preserves them from caterpillars, slugs, etc. A paste of one part powdered chloride of lime and one-half part of some fatty matter placed in a narrow band around the trunk of the tree, prevents insects from creeping up it. Even rats, mice, cockroaches and crickets flee from it.

GRAFTING WAX.

Take 10 pounds of resin and add two pounds of beeswax and one-fifth gallon of raw linseed oil; melt the resin and beeswax, then add the linseed oil; as the mass cools work it with the hands in sticks or any shape desired.

HOW TO MAKE HENS LAY IN WINTER.

Give a portion of minced meat, mixed with their other food, every day, or as often as convenient, and see that they have plenty of gravel, old plastering, or powdered egg shells. The latter may be mixed with their

food. Without some substance of this kind, which cannot be obtained when the ground is frozen or covered with snow, there will be nothing to form the shell.

TO PREVENT HENS FROM SITTING.

Put in a trough sufficient water to make a depth of one inch; place the hen therein, and cover the top for a about a day. The trough should be deep enough to allow the hen to stand up.

ARMY WORMS.

. Army worms may be effectually destroyed and checked by sprinkling the vegetation in the garden or field with salt water.

WHITEWASH.

A good whitewash for fences, barns and outhouses may be made as follows: Slack fresh lime in boiling water; to every three gallons of the whitewash add one quart of molasses and one pint of salt. This whitewash will not rub off. For coloring, add Prussian blue or red ochre

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HOW TO WEIGH A HAYSTACK.

Measure the length and breadth of the stack; take height from the ground to the eaves, add to this last one-half of the height from the eaves to the top; multiply length by breadth, and the product by the height, all expressed in feet; divide the amount by 27, to find the cubic yards, which multiply by the number of pounds supposed to be in a cubic yard, viz.: in a stack of new hay, 132 pounds avoirdupois each; if old hay, 154 pounds each.

HOW TO PRESERVE EGGS.

To each pailful of water, add two pints of fresh slacked lime, and one pint of common salt; mix well. Fill your barrel half full with this fluid.

put your eggs down in it any time after June, and they will keep two years if desired.

Insects of all description on plants, animals or in the house, may be destroyed by Pennyroyal dusted on the house plants, animals or crevices in the house, barn or poultry yard. Plant lice on rose bushes are destroyed by a lotion of quassia chips. Take four ounces of quassia chips and boil for ten minutes in soft water, add four ounces of soap; strain, and the mixture is ready for use to sprinkle on the plants.

LIME WATER.

Lime ..... 4 ounces.
Water ..... 1 gallon.

First slack the lime with a small portion of the water, then add the remainder and stir them together and cover the vessel immediately; in about three hours it is ready for use. Always keep in a well stoppered bottle.

CHEESE MAKING.

It is not difficult to make cheese for home use. Place the milk in a tin vessel and place the vessel in a larger one, to avoid burning the milk; place over a fire and heat to 80 degrees Fah. The milk is then subjected to the action of the rennet, about one-half drachm to every gallon of milk; stir in the milk for 20 minutes, then separate the liquid from the curd; cut the curd in small blocks; when the blocks crumble or separate, add three drachms of salt for every gallon of milk used. Form the curd then in the desired form and place under a press and leave for 18 hours; the cheese is then cured; color the outside with some anatto and keep in a room or cellar in a temperature of about 70 degrees Fah. until ready to use the cheese for the table.

PICKLE TO KEEP BEEF, TONGUES OR PORK.

To one gallon of water add two pounds salt, three-fourths pound sugar, one-half ounce saltpeter, one-half ounce of potash; boil together and skim off the top; pour this pickle over the beef and keep the beef immersed in the pickle by a weight.

POULTRY FOOD TO MAKE HENS LAY.

Powdered egg shells or lime, 8 ounces, sulphate of iron 8 ounces, powdered black pepper 2 ounces, powdered dog biscuit 12 ounces, powdered capsium 8 ounces; mix a tablespoonful in the feed for 25 hens.

POULTRY, SIZE OF EGGS.

Layers of large eggs, averaging about 7 to a pound: LaFleche, Houdans, Creve Coeurs, and Black Spanish. Layers of medium eggs, averaging 8 to 9 pounds: Leghorns, Cochins, Brahmas, Polands, Dorkings, Games, and Sultans.

PRESERVING BUTTER.

To preserve butter, wrap the butter in clean cloth and submerge in strong salt brine.

PROTECTION AGAINST FROST.

To protect budding vines and blossoming fruit trees from damage which may be caused by late frosts, the Germans have, in some instances, resorted to smudges. Different materials are used for the purpose, old straw or hay, tar, leaves, etc., but success in each case depends upon the generation of sufficient smoke to cover the vines and trees to be protected. Doctor Noerdlinger, according to a consular report, at his chemical works at Florsheim on the Main, manufactures a patented smudge, called rauchermasse, the formula for which is a trade secret, which he claims has many advantages over the other materials used for smoking vines and trees, especially tar. The patented article may be taken from the barrel with shovels and transferred to smaller receptacles, while tar, being thick and viscous, is difficult and disagreeable to handle. The combustion of the rauchermasse is more complete than that of tar, requires but little attention when burning; fresh quantities may be added to the fire without danger, and it leaves but little ash, while the ash percentage of tar is as high, in some cases, as 30 per cent. The rauchermasse may be burned in buckets, boxes, old barrels, etc., or in small holes made in the ground. It can be safely ignited with a match, or a handful of straw, shavings, paper, etc., dipped in petroleum, and can be stored indefinitely without deterioration.

PUTTY FOR HOTBED SASHES.

Five pounds of whiting, one-half pound white lead, or boiled oil and whiting, mixed to desirable thickness.

RENOVATING BUTTER.

Wash the butter in sweet milk or run the butter through the churn, then wash in clean cool water and the butter will be greatly improved. As the rancidity is freely soluble in pure milk and which the milk will absorb.

REMEDIES FOR SCALDS AND BURNS.

The immediate application of kerosene oil and the parts covered with flour affords relief, according to the Medical Record. Pure white lead paint applied is the safest and best remedy known for fire burns, friction or acid burns.

TO ARREST BLEEDING.

Mix two ounces charcoal and gum arabic in powdered form, two ounces, and resin four ounces and apply to wounds.

TO DESTROY COCKROACHES.

This troublesome pest may be destroyed by a mixture of red lead, Indian meal and molasses. This mixture is eaten by them and causes death. Powdered borax strewn around their haunts is also advisable.

TO DESTROY RATS.

POISONING.

Barium Carbonate.—One of the cheapest and most effective poisons for rats and mice is barium carbonate, or barytes. This mineral has the advantage of being without taste or smell; and, in the small quantities used in poisoning rats and mice, is harmless to larger animals. Its action on rodents is slow, but reasonably sure, and has the further advantage that the animals before dying, if exit be possible, usually leave the premises in

search of water. Its employment in houses, therefore, is rarely followed by the annoying odor which attends the use of the more virulent poisons.

The poison may be fed in the form of a dough made of one-fifth barytes and four-fifths meal, but a more convenient bait is ordinary oatmeal, with about one-eighth of its bulk of barytes, mixed with water into a stiff dough; or the barytes may be spread upon bread and butter or moistened toast. The prepared bait should be placed in rat runs, a small quantity at a place. If a single application of the poison fails to drive all rats from the premises, it should be repeated with a change of bait.

Strychnine.—Strychnine is a more virulent poison, but its action is so rapid that the animals often die upon the premises, a circumstance which prohibits its use in occupied dwellings. Elsewhere strychnine may be employed with great success. Dry strychnine crystals may be inserted in small pieces of raw meat, Vienna sausage, or toasted cheese, and these placed in the rat runs; or oatmeal may be wet with a strychnine sirup, and small quantities laid out in the same way.

Strychnine sirup is prepared as follows: Dissolve a half ounce of strychnia sulphate in a pint of boiling water; add a pint of thick sugar sirup and stir thoroughly. A smaller quantity of the poison may be prepared with a proportional quantity of water. In preparing the bait it is necessary that all the oatmeal should be moistened with sirup. Wheat is the most convenient alternative bait. It should be soaked over night in the strychnine sirup.

Other Poisons.—The two poisons most commonly used for rats and mice are arsenic and phosphorous, nearly all commercial preparations containing one or the other as a basis. While experiments prove that rats have great powers of resistance to arsenic, it may sometimes be used advantageously as an alternative poison. Preparations of phosphorus sold by druggists are often too weak to be effective; and home-made mixtures, when of sufficient strength, are dangerous, as rats may carry the baits into walls or crannies and thus cause fires. For these and other reasons the Biological Survey does not recommend preparations containing phosphorus.

Poison in the Poultry House.—For poisoning rats in buildings and yards occupied by poultry, the following method is recommended: Two wooden boxes should be used, one considerably larger than the other, and each having two or more holes in the sides large enough to admit rats. The poisoned bait should be placed on the bottom and near the middle of the larger box, and the smaller box should then be inverted over it. Rats thus have free access to the bait, but fowls are excluded.

TO DESTROY STUMPS.

Stumps may be destroyed by boring a hole 18 inches deep; put in the hole three ounces of saltpeter and fill the hole with water, stop up tight; a few weeks afterwards, during dry weather, apply fire and the stump will be entirely consumed.

TO KILL BERMUDA OR OTHER GRASSES.

No one questions the great value of Bermuda and Johnson grass or has fault to find with them, except the difficulty of getting rid of them. But this can be done when properly undertaken. An Alabama farmer says this about it:

Bermuda grass, while one of the best pasture grasses we have in the South, is hard to kill out; in fact, it cannot be killed at all by plowing in the spring and summer, unless the ground is very dry; but my plan is to plow it up in winter and let it freeze, and as soon as the ground thaws run a drag harrow over it, and let it freeze again, and as soon as the ground is dry enough cross plow, and let it freeze before harrowing. Do this three times, and you will not have much grass left, if any.

I always plow shallow in Bermuda sod, and it takes two good horses to pull a small plow through the first time.

I kill Johnson grass the same way, being careful not to allow any of it to seed the summer before, as the seed will lie in the ground all winter and come up in the spring. The ground must be plowed deep enough to turn out all the roots.

TO MAKE CLOTH WATERPROOF FOR HOTBEDS AND OTHER USES.

Steep the cloth for thirty hours in a solution of two pounds of oak bark and twenty pounds of water.

TO KEEP COVERS FOR HOTBEDS FROM MILDEWING.

Steep the cloth in lime water for two hours, then hang out to dry.

GRAVEL WALKS.

To make gravel walks permanent, take lime and coal ashes, mix with gravel and pour hot coal tar over the walks.

Stoves or ranges may be mended with equal parts of salt and wood ashes; mix with water until it forms a paste, and apply to the worn or cracked parts.

TO PRESERVE LUMBER.

Lumber treated with steam at a low pressure which has been passed through a vessel containing sulphate of zinc and alum.

TO PRESERVE PLANTS.

To preserve plants and flowers, with their natural color, shake them quite dry and immerse them in a solution of one pint salicylic acid and one quart of alcohol.

GNATS.

The application of spirits of camphor keeps gnats from man or beast and also reduces inflammation of the stings.

TO PRESERVE ROPES.

Ropes may be preserved by steeping in a solution of sulphate of copper, two ounces to one-half gallon of water and then immerse them in hot tar.

TO PURIFY HONEY.

To every ten gallons of honey add the whites of two eggs, beat the honey until froth appears, add water and boil, skim the top; allow it to stand a week, then draw off the pure honey from the bottom.

TO PREVENT RUST.

Implements of either iron or steel may be made rust-proof by the application with the brush of a solution of India rubber dissolved in benzine. To remove rust from iron or steel, cover the articles wit hsweet oil; in 24 hours rub with unslaked lime.

TO TELL AGE OF A HORSE.

At public sales one sees so many old animals sold for young ones that one who knows how to tell their ages feels a little twinge of conscience on seeing a neighbor buy a 14-year-old mare for a 6-year-old and pay a 6-year-old price for the same. This knowledge has been worth so many dollars to me, I know it will be of value to others. Nearly everyone can tell a very old horse from a very young one. Occasionally one sees a sleek, fat, high-lived animal 12 or 14 years old, passing, from general appearance, for a 5 or 6-year-old. My father has a 4-year-old mare foundered and run down. The casual observer would say she is 15 anyway. General appearances are no criterion; neither are the eyes, nor the tushes, as some claim. What then? The front teeth of the lower jaw. There are six of them. They must be natural to be a true guide. A yearling has six, the two end ones being shorter and smaller than the other four. Deep cuts in center. A two-year-old has six, cups not so deep as those of a yearling. A 3-year-old has two longer teeth in center, with two short ones on either side. A 4-year-old has four long teeth and one short one on either side. A 5-year-old has six long teeth with deep cups in center. A 6-year-old has cups of the center teeth very shallow. A 7-year-old has the center teeth worn smooth, cups of second pair partly worn, i. e., not so deep as those of the end teeth. An 8-year-old has the second pair of teeth worn nearly smooth. A 9-year-old has the cups of end teeth very shallow. A 10-year-old is commonly known as a smooth-mouthed horse, i. e., no cups. From this on the age is reckoned by the end teeth. As the animal grows older the lower teeth become worn in proportion. The corners of the end teeth become rounded. To tell the age with any degree of accuracy beyond 12 years requires the examination of many sets of teeth.

TO TELL THE AGE OF EGGS.

In a brine of two ounces of salt and a pint of water a fresh egg will sink to the bottom; older eggs will suspend in the brine, while a stale egg will float on the top. Eggs for setting should be tested in this way.

TO KEEP MILK FROM SOURING.

Milk may be kept from souring by adding a small quantity of boracic acid to the milk. This is not injurious to the health.

UNITED STATES LAND MEASURE AND HOMESTEAD LAW.

A township is 36 sections, each a mile square. A section is 640 acres. A quarter section, half a mile square, is 160 acres. An eighth section, half a mile long, north and south and a quarter of a mile wide, is 80 acres. A sixteenth section, a quarter of a mile square, is 40 acres.

The sections are all numbered to to 36, commencing at northeast corner, thus:

6	5	4	3	2	NW NE SW SE
7	8	9	10	11	12
18	17	16*	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

*School Section.

The sections are all divided in quarters, which are named by the cardinal points, as in section 1. The quarters are divided in the same way. The description of a forty-acre lot would read: The south half of the west half of the southwest quarter of section 1 in township 24, north of range 7 west, or as the case might be; and sometimes will fall short, and sometimes overrun the number of acres it is supposed to contain.

TO TRY LARD.

Place the scraps in a kettle and cook. For twenty pounds of lard add one tablespoon of saleratus; empty the lard into crocks and the lard will not become mouldy.

TO UTILIZE BONES FOR FERTILIZERS.

Take one barrel of bones, add one peck of ashes and one peck of lime, and boil for a few hours, when all the bones will be dissolved; mix with other manures.

NUMBER OF WINDOW LIGHTS PER BOX OF 50 FEET.

Size.	Number.	Size.	Number.
6 by 8	150	11 by 12	55
7 " 9	115	11 " 13	51
8 " 10	90	11 " 14	47
8 " 11	82	11 " 15	44
8 " 12	75	11 " 16	41
9 " 11	73	11 " 17	39
9 " 12	67	11 " 18	37
9 " 13	62	11 " 20	33
9 " 14	57	11 " 22	30
9 " 15	53	11 " 24	27
9 " 16	50	12 " 14	43
9 " 18	45	12 " 15	40
10 " 12	60	12 " 16	38
10 " 13	55	12 " 17	35
10 " 14	52	12 " 18	34
10 " 15	48	12 " 20	30
10 " 16	45	12 " 22	27
10 " 17	43	12 " 24	25
10 " 18	40	12 " 26	23
10 " 20	36	12 " 28	22
10 " 22	33	12 " 30	20
10 " 24	30	12 " 32	19
10 " 26	28	12 " 34	18
10 " 28	26	12 " 36	17
10 " 30	24	13 " 14	40

Size.	Number.
13 by 15	37
13 " 16	35
13 " 18	31
13 " 20	28
13 " 22	25
13 " 24	23
13 " 26	21
13 " 28	20
13 " 30	19
13 " 32	17
14 " 15	34
14 " 16	32
14 " 17	31
14 " 18	29
14 " 20	26
14 " 22	24
14 " 24	22
14 " 26	20
14 " 28	19
14 " 30	17
14 " 32	16
14 " 34	15
14 " 36	14
14 " 38	14
14 " 40	13
14 " 42	12
14 " 44	12
14 " 46	11
15 " 16	30
15 " 18	27
15 " 20	24
15 " 22	22
15 " 24	20
15 " 26	19
15 " 28	17
15 " 30	16
15 " 32	15
15 " 34	14
15 " 36	13

Size.	Number
15 by 38	13
15 " 40	12
16 " 16	28
16 " 18	25
16 " 20	23
16 " 22	21
16 " 24	19
16 " 26	17
16 " 28	16
16 " 30	15
16 " 32	14
16 " 34	13
16 " 36	13
16 " 38	12
16 " 40	11
16 " 42	11
16 " 44	10
16 " 46	10
16 " 48	9
16 " 52	9
16 " 54	8
16 " 60	8
18 " 20	20
18 " 22	18
18 " 24	17
18 " 26	16
18 " 28	14
18 " 30	14
18 " 32	13
18 " 34	12
18 " 36	11
18 " 38	11
18 " 40	10
18 " 42	10
18 " 44	9
18 " 46	9
18 " 50	8
18 " 52	8
18 " 56	7

Size.	Number.	Size.	Number.
18 by 60	7	22 by 24	14
20 " 22	16	22 " 26	13
20 " 24	15	22 " 28	12
20 " 26	14	22 " 30	11
20 " 28	13	22 " 32	10
20 " 30	12	22 " 34	10
20 " 32	11	22 " 36	9
20 " 34	11	22 " 38	9
20 " 36	10	22 " 40	8
20 " 38	10	22 " 42	8
20 " 40	9	22 " 44	7
20 " 42	9	22 " 48	7
20 " 44	8	22 " 50	7
20 " 46	8	22 " 52	6
20 " 48	8	22 " 56	6
20 " 50	7	22 " 60	5
20 " 54	7	24 " 24	13
20 " 58	6	24 " 26	12
20 " 64	6		

HOW TO WEIGH WITHOUT SCALES

To weigh without scales remember that ten eggs weight one pound; soft butter the size of an egg weighs one ounce; one pint A sugar weighs twelve ounces; one quart flour weighs one pound; one pint brown sugar weighs thirteen ounces; two teacups (level) granulated sugar weigh one pound; two teacups (well heaped) A sugar weigh one pound; two teacups soft butter weigh one pound; one pint liquor weigh one pound; one pint chopped meat weighs one pound.

TO MAKE A CEMENT HOUSE.

One of the most useful houses I have seen lately is one constructed from top to bottom from gravel and cement. It is eight by ten feet on the inside, with a ten-foot ceiling. The floor is cemented and is four feet below the center of the earth. The walls of the building are a foot thick, with nearly two inches of air space running along the center of them.

It was constructed in the following manner: After the excavation was made 2x4 oak pieces were set to each side and the ends so that when the boards were nailed to them space was formed for the bottom layer of cement. When this was put in planks were nailed above these for another course. This plan was followed until the building was the desired height. Then an oval roof was constructed from oak boards with circular rafters resting in the top layer of cement. On this at the proper time was placed a cement roof. The roof rested on the frame work until dry, then the frame work was permitted to remain to strenghten the roof. The door facing is held by bolts laid in cement and projecting through its sides. The doors when hung will be double on the outside, packed in between with sawdust. The inner door will be light. The house will be fitted up with a stove and grates and used for a fruit dryer in the fall. In the winter it will be used to store fruit and vegetables in. There is no drain, but a large stone jar was set in the cement in one corner of the building and the floor made to incline toward it.

HOW DEEP IN THE GROUND TO PLANT CORN.

The following is the result of an experiment with Indian corn. That which was planted at the depth of

One inch, came up	8½ days
One and one-half inch, came up in	9½ days
Two inches, came up in	10 days
Two and one-half inches, came up in	11½ days
Three inches, came up in	12 days
Three and one-half inches, came up in	13 days
Four inches, came up in	13½ days

The more shallow the seed was covered with earth, the more rapidly the sprout made its appearance, and the stronger afterwards was the stalk. The deeper the seed lay, the longer it remained before it came to the surface. Four inches was too deep for the maize, and must, therefore, be too deep for smaller kernels.

TO SELECT COW.

1st. A cow must be young. She is in her prime 4 to 6 years, and the best paying time to buy is just after the second or third calf.

2nd. Prominence and fulness of milk veins, and velvety softness of skin. The milk veins run down on either side of the animal towards the udder, and are easily perceptible to the eye, or can be readily found by pressure of the hand, if the animal is not over fat. The skin should be soft and mellow, not hard and rough.

3rd. Must have good shape, fullness, softness, well spread out, perfect number of teats, or milk will be scarce; quiet, and of a good disposition; this will exhibit itself in her eyes, which must be mild and clear. A cow that is quiet and contented feeds at ease, chews her cud with entire satisfaction, thereby yielding a greater amount of milk than a restless or turbulent animal.

TABLE SHOWING THE QUANTITY OF GARDEN SEEDS REQUIRED TO PLANT A GIVEN SPACE.

Designation.	
Asparagus	1 oz. produces 1000 plants, and requires a bed 12 feet square.
Asparagus Roots	1000 plants, a bed 4 feet wide, 225 feet long.
English Dwarf Beans	1 quart plants from 100 to 150 feet of row.
French Dwarf Beans	1 quart plants 250 or 350 feet of row.
Beans, Pole, large	1 quart plants 100 hills.
Beans, Pole, small	1 quart plants 300 hills, or 250 feet of row.
Beets	10 lbs. to the acre; 1 oz. plants 150 feet of row.
Broccoli and Kale	1 oz. plants 2500 plants, and requires 40 square feet of ground.
Cabbage	Early sorts same as broccoli, and require 60 square feet of ground.
Cauliflower	The same as cabbage.
Carrot	1 oz. to 150 feet of row.
Celery	1 oz. gives 7000 plants, and requires 8 square feet of ground.
Cucumber	1 oz. for 150 hills.
Cress	1 oz. sows a bed 16 feet square.
Egg Plant	1 oz. gives 2000 plants.
Endive	1 oz. gives 3000 plants and requires 80 feet of ground.
Leek	1 oz. gives 2000 plants and requires 60 feet of ground.
Lettuce	1 oz. gives 7000 plants and requires -eed bed of 120 feet.
Melon	1 oz. for 120 hills.

Nasturtium.....1 oz. sows 25 feet of row.
Onion.....1 oz. sows 200 feet of row.
Okra.....1 oz. sows 2000 feet of row.
Parsley.....1 oz. sows 2000 feet of row.
Parsnip.....1 oz. sows 250 feet of row.
Peppers.....1 oz. gives 2500 feet of row.
Peas.....1 qt. sows 120 feet of row.
Pumpkin.....1 oz. to 50 hills.
Radish.....1 oz. to 100 feet.
Salsify.....1 oz to 150 feet of row.
Spinach.....1 oz. to 200 feet of row.
Squash.....1 oz. to 75 hills.
Tomato.....1 oz. gives 2500 plants, requiring seed bed of 80 feet.
Turnip.....1 oz. to 2000 feet.
Watermelon.....1 oz. to 50 hills.

[THE END.]

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